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UNITED STATES DEPARTMENT OF THE INTERIOR
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UNITED STATES DEPARTMENT OF THE INTERIOR
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Leslie L. Glasgow, *Assistant Secretary for Fish and Wildlife and Parks*

U.S. FISH AND WILDLIFE SERVICE
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FOREWORD

The Department of the Interior's Bureau of Commercial Fisheries publishes the monthly journal *Commercial Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

Commercial Fisheries Abstracts contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.

Leslie L. Glasgow
Assistant Secretary for Fish and
Wildlife and Parks

0.114 A SIMPLE PRECISION CURRENT-REGULATED POWER SUPPLY FOR LABORATORY LAMPS

DeSa, Richard J. (Department of Biochemistry, University of Georgia, Athens, Georgia 30601)
Analytical Biochemistry 35, No. 1, 293-296 (May 1970)

High-pressure Xenon arcs have high intrinsic brightness and wide-band spectral characteristics, and are often used in modern spectrophotometric and fluorometric instruments. They can be rapidly modulated and this property of the lamps has been applied in a special-purpose stopped-flow spectrophotometer (DeSa and Gibson, 1966). However, a well-regulated power supply is necessary when the lamp is used in an instrument whose light detection system responds to alternating current ripple. Also, use of a well-regulated current source for power will eliminate the arc instability in xenon lamps. Commercially available power supplies are frequently inadequately regulated and well-regulated supplies are expensive. In this paper, the author describes a simple power supply and precision regulator that is highly reliable and fully adequate to provide stable ripple-free operation of 150 w. xenon arcs in stopped-flow and fluorescence instruments. The power supply can be readily constructed at low cost by any competent electronics shop. A complete circuit diagram is given. [1 figure, 4 references]

0.116 CENTRI-CHROMATOGRAPHY
(7.59)

Karasek, F. W.
Research/Development 21, No. 7, 43-44, 46 (July 1970)

This paper describes a new liquid chromatography technique based on use of a centrifuge and some simple devices. Liquid chromatography techniques provide high analytical selectivity because of the moving liquid carrier and also provide the ability to analyze solid mixtures directly.

With this technique, a centrifuge (rather than a pump) furnishes the high pressure to move the carrier liquid through the chromatographic column. Accordingly, the apparatus may be simple, and super-small particles--100 to 200 Å--may be used to pack the columns. High separation efficiencies may be obtained with glass tubing columns no longer than 67 mm. and only 3 mm. in internal diameter. The column is densely packed by the force of the centrifuge. The simple chromatographic apparatus fits nicely into the conventional swinging bucket sample holder of the centrifuge. An illustration and a diagram of the chromatographic apparatus are given. The following table lists several mixtures that have been analyzed by this method for all the components. [4 figures, 4 references]

(over)

0.114 AN IMPROVED MOVING WIRE LIQUID CHROMATOGRAPHY DETECTOR
(0.116)

Scott, R. P. W., and J. G. Lawrence (Unilever Research Laboratory, Colworth House, Sharnbrook, Bedford, England)
Journal of Chromatographic Science 8, No. 2, 65-71 (February 1970)

The moving wire detector functions as follows: a thin film of the column eluant wets the surface of a wire. The wire passes into an evaporator where the mobile phase is removed, and from there to a pyrolyzer where the involatile solutes are pyrolyzed. The decomposed products are swept by a gas stream into an argon or flame ionization detector. The sensitivity of such a detector is about 4 µg./ml. of solute in the mobile phase.

In this paper, the researchers describe a modified instrument in which the solute obtained after evaporating the mobile phase is burnt in oxygen to carbon dioxide and water. Then, the carbon dioxide and excess oxygen are mixed with hydrogen and the mixture passed over a nickel catalyst where the CO_2 is converted to methane. The methane is then detected by a flame ionization detector. This modified system is sensitive to 1.1 µg./ml. of solute in the mobile phase. The response of the detector is linear over 4 orders of concentration range. The response is quantitative to the mass of solute on the wire and can be predicted from the carbon content of the solute providing the molecular formula is known. [2 figures, 10 tables, 6 references]

0.116 CHROMATOGRAPHY OF MICROBIAL LIPIDS BY CENTRIFUGATION THROUGH MICROPARTICULATE GEL

Ribi, Edgar, Charles Filz, Karin Ribi, Granville Goode, William Brown, Makoto Niwa, and Robert Smith (National Institute of Allergy and Infectious Diseases, Rocky Mountain Laboratory, and Ivan Sorvall, Inc., Instrument Research Laboratory, Hamilton, Montana 59840)
Journal of Bacteriology 102, No. 1, 250-260 (April 1970)

Centrifugal chromatography has not been used extensively because methods for general use have not been developed and the necessary equipment has not been available. The present authors developed an improved apparatus and a procedure in which the migration of sample components in column chromatography is accelerated by centrifugal force. With this method beds of densely packed gel prepared from ultrafine silica may be used in the column. This paper reports on the use of the technique to resolve components of certain lipid mixtures.

By means of centrifugal chromatography, the researchers found a major and several minor components in biologically active phosphoglycolipids from Mycobacterium tuberculosis and in a phosphatidylglycerollike substance from Mycoplasma pneumoniae--these materials formed only single spots on thin-layer chromatographic plates. Also, individual components, rather than a spectrum of components, of Wax D were isolated from M. tuberculosis. These minor components, although present in insufficient quantity to influence results of chemical analyses, may be responsible for biological activity.

(over)

0.116 THERMIONIC DETECTORS IN GAS CHROMATOGRAPHY

Brazhnikov, V. V., M. V. Gur'ev, and K. I. Sakodynsky (Karpov's Institute of Physical Chemistry, Moscow, U.S.S.R.)
Chromatographic Reviews 12, No. 1, 1-41 (January 1970)

This is a review article dealing with (1) the design and construction of thermionic detectors (TID), (2) the characteristics of TID's, (3) the physical fundamentals of detection, and (4) the applications of the TID's. The TID system has a high selectivity and sensitivity to compounds containing halogens and phosphorus in particular. [17 figures, 6 tables, 137 references] FTP

$\kappa g_* = gravity$

Details of the centri-chromatographic analysis of biological mixtures

Analytical Item	Lipids	Triglycerides	Steroid hormones	Urinary steroids	Drugs
Composition of the mixture	Stearic acid Cholesterol Tristearin Methyl stearate Cholesteryl stearate	Trilinolenin Trilinolein Trilolein	Hydrocortisone Prednisone Corticosterone Reichstein "S" Estradiol Testosterone Estrone Progesterone	Pregnanediol Etiocholanolone Androsterone epiandrosterone Dehydro-epiandrosterone Pregnane-3, 20-dione	Dapsone (DDS) Monoacetyl (DDS) Diacetyl (DDS)
Column	Quso G32 silica	Quso G32 silica	Quso G32 silica	Quso G32 silica	Quso G32 silica
Liquid	Benzene	Iso-octane with 0.5 acetic acid	Chloroform-methanol 150:1	Cyclohexane-chloroform 1:1	Chloroform-methanol 97:3
Pressure ($\times g_*$)	2500	2500	2500	2500	4500
Analysis time (minutes)	7	15	8	11	5

0.116

0.12 MATERIALS FOR SEAWATER COOLING

Desensy, M. G. J. (Badger N.V., The Hague, Holland)
Chemical Engineering 77, No. 13, 182, 184, 186, 188 (June 15, 1970)

For certain applications and conditions, sea water or brackish water may be a more economical cooling medium than cooling-tower water. The economics of alternative systems (fresh water, cooling-tower water, air coolers, brackish water, salt water, or sea water) should first be determined before a final selection is made. The author states that brackish water or salt water can be recycled through a cooling tower with the addition of makeup water and this approach is attractive because of the low installation and operating costs involved.

In a sea-water cooling system, the construction materials must be compatible with the water supply used. Use of sea-water cooling imposes special requirements on composition and design of the equipment. In this article, the alloys used in and the characteristics of heat exchangers, tube sheets, coated exchangers, piping, and valves. [2 illustrations, 1 table] FTP

Because the apparatus is a closed system, the evaporation of highly volatile solvents is reduced to a minimum during the chromatographic process. The samples are applied in solution. The extruded column is oven dried after the sample separation is achieved. Polar, labile microbial lipids can be resolved without the use of harsh reagents that may destroy their properties. Single components may be obtained by cutting out appropriate segments of the chromatograms or by eluting them from the columns. [15 figures, 16 references]

0.116

0.112 CONSTRUCTION AND PERFORMANCE OF A SENSITIVE LIGHT METER
(2.12)(9.11) FOR UNDERWATER USE

Ackefors, Hans (Institute of Marine Research, Fishery Board of Sweden, Lysekil), Gunnar Ahnström, and Carl-Gustaf Rosén (Radiobiology Division, Dept. of Biochemistry, Royal University of Stockholm, Sweden)
Limnology and Oceanography 14, No. 4, 613-617 (July 1969)

A portable light meter consisting of a 10-kg. underwater probe, a control unit with power supply, and a current-measuring device is described. It has been tested under primitive conditions (without access to stabilized power supplies), in calm and in rough seas, from a small fishing boat. It satisfactorily measured light intensities down to depths of about 100 m. One person can operate the light meter.

A detailed, mimeographed description of the light meter is available on request. [4 figures, 7 references] LB

0.114 A SIMPLE RADIOACTIVITY RECORDING SYSTEM FOR COLUMN CHROMATOGRAPHY OF ^{32}P-LABELED PRODUCTS
(0.116)

Jordan, B. R. (Centre National de la Recherche Scientifique, Centre de Biologie Moléculaire, 31 chemin Joseph Aiguier, 13 Marseille 9e, France)
Analytical Biochemistry 35, No. 1, 244-248 (May 1970)

In certain applications, the radioactivity of the effluent from a chromatographic column is monitored and recorded continuously. Several instruments have been designed for this purpose and a commercial apparatus is available. The instrument is generally designed for tritium and carbon-14 counting, based on the scintillation technique, and is consequently complex and expensive. For detection of high energy beta emitters, a much simpler system can be built around a GM counter. In this paper, the author describes a simple radioactivity recording system that has been used successfully and economically in the routine preparation of ^{32}P-labeled fractions. [3 figures, 7 references] FTP

0.118 MOLECULAR WEIGHT CHROMATOGRAPHY

Paul, D. G. (Chemalytics Corporation), and G. R. Umbreit (Greenwood Laboratories, Inc.)
Research/Development 21, No. 5, 18-20 (May 1970)

A system is described with which the molecular weight and absolute weight can be derived of each component of any sample that might logically be analyzed by gas chromatography with thermal conductivity detection. The weights are derived directly from measurement of the chromatographic peak area without the need to have any of the components available as qualitative or quantitative standards. The only calibration step required is introduction into the instrument of a single standard compound of known weight; this compound does not necessarily have to be related to any of the sample components. [3 figures, 3 tables] LB

0.119 SIMPLE METHOD FOR COLLECTION OF SAMPLES FROM A FROZEN FOOD

Adams, D. M., and F. F. Busta (Department of Food Science and Industries, University of Minnesota, St. Paul, Minnesota 55101)
Applied Microbiology 19, No. 5, 878 (May 1970)

Frozen foods may be sampled by drilling into the product with an electric drill. One problem that arises from this method is the aseptic collection of the shavings. The authors propose the use of the conical end of a plastic funnel. The funnel is cut off at a point where the hole is just larger than the drill bit. In the drill sampling operation, the drill bit is inserted through the small opening in the funnel and the shavings collected in the funnel. The funnel can be sterilized for aseptic collection of a sample.
[1 figure, 1 references] FTP

0.321 BLOOD PLASMA PROTEINS OF COLD-ADAPTED ANTARCTIC FISHES

Komatsu, Stanley K., Herman T. Miller, Arthur L. Devries, David T. Osuga, and Robert E. Feeny (Department of Food Science and Technology, University of California, Davis 95616)
Comparative Biochemistry and Physiology 32, No. 3, 519-527 (February 1, 1970)

In an effort to determine the effects of cold adaptation on molecular systems of higher organisms, the authors have been examining the proteins of the blood and muscles of Antarctic fishes adapted to temperatures at or below 0° C. In this report, they describe some general properties of the plasma proteins of six species of Antarctic fish and the effects of temperature on the blood-clotting time of one, Trematomus borchgrevinki, relative to that in man, rabbit, carp (Cyprinus carpio), western sucker (Catostomus occidentalis), and rainbow trout (Salmo gairdneri).

The results show that all fish serum transferrins are more acidic than human ones. The serum transferrin of T. borchgrevinki was more heat labile than that of man. The Antarctic fish serum had less albumin and more lipoprotein than did the sera of man or of non-Arctic fishes; also, it contained freezing-point-depressing glycoproteins that none of the other sera studied contained.

The blood of T. borchgrevinki and trout clotted faster than that of carp and sucker; the blood of rabbit and man had very long clotting times at 0° C. The blood of T. borchgrevinki had an apparent minimum clotting time when its temperature was between 25° and 30° C. The capacity to clot was destroyed when it was incubated at between 38° and 40° C. [8 figures, 1 table, 23 references]

0.4 (9.13)(4.5) LIPID OXIDATION IN BIOLOGICAL MEMBRANES
I. LIPID OXIDATION IN SUBMITOCHONDRIAL PARTICLES AND MICROSOMES INDUCED BY CHAOTROPIC AGENTS
II. KINETICS AND MECHANISM OF LIPID OXIDATION IN SUBMITOCHONDRIAL PARTICLES

Hatefi, Y., and W. G. Hanstein (Department of Biochemistry, Scripps Clinic and Research Foundation, La Jolla, California 92307)
Archives of Biochemistry and Biophysics 138, No. 1, 73-86; Part II, 87-95 (May 1970)

These two studies deal with lipid oxidation in submitochondrial particles and microsomes as induced by chaotropic agents. These topics are considered in regard to (1) the relation between membrane structure and lipid oxidation, (2) the kinetics of lipid oxidation in various membranes, (3) the capacity of membrane-bound lipids to undergo oxidation, and (4) the possible catalysts of lipid oxidation in mitochondria and microsomes. In part I the authors discuss results in relation to the structure, function, and lipid composition of submitochondrial particles and microsomes. In part II, the results are discussed in relation to the structure of membranes and the structure of water.
[Part I: 10 figures, 6 tables, 30 references]
[Part II: 8 figures, 2 tables, 28 references]

0.35 PROTEINS IN EXCITABLE MEMBRANES

Nachmansohn, David (Department of Neurology and Biochemistry, College of Physicians and Surgeons, Columbia University, New York, N.Y. 10032)
Science 168, No. 3935, 1059-1066 (May 29, 1970)

This report discusses the properties and functions of proteins in the excitable membranes of cells. The central role of proteins and enzymes in cell membranes accounts for their great diversity of function, their specificity, and their efficiency more readily than do previous concepts based on the physicochemical properties of phospholipids.

The specific chemical forces underlying cellular mechanisms (such as motility, energy supply, vision, genetic control) are similar throughout the animal kingdom. This similarity also applies to the specific chemical forces underlying bioelectricity (to the specific proteins controlling the changes of ion permeability in excitable membranes). The diversity of bioelectric phenomena and the variations of pharmacological effects may be explained by the differences of cellular structure, shape, and environment between junctions and axons. These factors modify the effects of chemical reactions in the membranes and the actions of compounds applied externally. [4 figures, 115 references]

0.5 (3.5)(3.12) ISOLATION OF HALOPHILIC AND HALOTOLERANT BACTERIA FROM SOLAR SALT

Ishida, Yuzaburo, and Tateo Fujii (Department of Fisheries, Kyoto University, Maizuru, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 4, 391-396 (April 1970)

Because of the importance of sodium chloride as a preservative for fish, the authors have undertaken to clarify the mechanism by which microorganisms can grow in a high-salt environment. This report concerns a taxonomic study of the bacteria that were isolated from imported solar salt, a seafood preservative commonly used in Japan.

A larger number of bacteria were found at high concentrations of NaCl than at low concentrations. The bacteria belonged mainly to the Flavobacterium, Brevibacterium, and Micrococcus genera--the two former corresponding to the obligate halophiles and the latter to the facultative halophiles defined by Ingram in 1957. The authors redefined the two types of organism as halophilic (organisms that will grow only in the presence of high salt concentrations) and halotolerant (organisms that can grow whether salt is present or not), respectively. Between 2.4 and 4.8 $\times 10^5$ bacterial cells per gram of salt were isolated from the test preservative. [1 figure, 4 tables, 8 references]

0.39 (9.19) DDT METABOLISM: OXIDATION OF THE METABOLITE 2,2-bis(p-CHLOROPHENYL)ETHANOL BY ALCOHOL DEHYDROGENASE

Suggs, Joseph E., Robert E. Hawk, August Curley, and Elizabeth L. Boozer (Bureau of Science, Food and Drug Administration, Atlanta, Georgia 30333), and James D. McKinney (National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina 27709)
Science 168, No. 3931, 582 (May 1, 1970)

Peterson and Robinson (1964) showed that the metabolism of DDT (1,1,1-trichloro-2,2-bis(chlorophenyl)ethane] in mammals gives rise to 2,2-bis(p-chlorophenyl)ethanol (DDOH) and 2,2-bis(p-chlorophenyl)acetic acid (DDA). An intermediate aldehyde has been suggested, but it has not been found to occur in vivo.

The present study showed that 2,2-bis(p-chlorophenol)acetaldehyde, a metabolite of DDT, is a substrate of crystalline liver alcohol dehydrogenase. The authors determined the oxidation of the substrate spectrophotometrically. They identified the p-nitrophenylhydrazone derivative of the aldehyde by comparing its mass spectrum and thin-layer chromatographic behavior with that of an authentic sample. [3 references] FTP

0.322 AUTOMATIC SYSTEMS FOR DETECTING CYSTINE AND CYSTINYL PEPTIDES DURING COLUMN CHROMATOGRAPHY

Walsh, Kenneth A., Rosa Mae McDonald, and Ralph A. Bradshaw (Department of Biochemistry, University of Washington, Seattle 98105)
Analytical Biochemistry 35, No. 1, 193-202 (May 1970)

This paper describes two automated methods for the determination of cystine and the detection of cystinyl peptides in solutions containing high levels of pyridine and acetic acid. [6 figures, 2 tables, 13 references] FTP

0.35 (0.4) PREPARATION OF IMMUNOGLOBULIN CONCENTRATES FROM HUMAN SERUM BY CHROMATOGRAPHY ON CONTROLLED PORE GLASS

Haller, Wolfgang, Klaus-D. Tympner, and Kurt Hannig (Max Planck Institut für Eiweiss- und Lederforschung, München, Germany)
Analytical Biochemistry 35, No. 1, 23-31 (May 1970)

Mammalian immunoglobulins play an important role in the defense mechanism against viral, bacterial, and other antigens. Laboratory methods for the analysis and preparation of the immunoglobulins are quite sophisticated but preparation of relative large quantities meets with several problems. These problems involve rate of throughput, protection of the substances and system, and maintenance of sterility. Chemical methods are used when large amounts of plasma or serum are processed. This paper reports on an attempt by the researchers to devise a rapid and economical method for providing from human serum protein fractions that are high in immunoglobulin M and to determine whether the biological functions of the isolated protein are preserved.

The human serum was fractionated by steric chromatography on porous glass of 175 Å average pore size. Haller (1965) described the details of the preparation of the chromatographic material, including definition and measurement of average pore size, and the principles of operation.

At the pores size used, the exclusion peak of the fractionated human serum contained all the immunoglobulin M, all the α_2-macroglobulin, and some immunoglobulin G. A concentrate, prepared by fourfold concentration of the exclusion peak by ultrafiltration, had an anti-E. coli titer of equal magnitude to the unfractionated serum at 20 percent of its original protein content. The column (1.2 cm. × 1 m.) had a capacity of approximately 100 ml. of undiluted serum per 24 hr. [4 figures, 1 table, 11 references] FTP

0.5 (3.12)(3.5) GROWTH BEHAVIOR OF HALOBACTERIA IN RELATION TO CONCENTRATION OF NACL AND TEMPERATURE OF ENVIRONMENTS

Ishida, Yuzaburo (Department of Fisheries, Kyoto University, Maizuru, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 4, 397-401 (April 1970)

The relation between temperature and concentration of NaCl on the growth of bacteria is very important not only in ecological research of marine environments but in the preservation of seafoods. This paper reports on the growth behavior of halophilic and halotolerant bacteria, isolated from solar salt, as a function of that relation.

Using 48 strains from the 135 previously isolated from solar salt, the author incubated each at three different temperatures in a liquid medium varying in salt content from 0 to 250 g./1,000 ml. water. Of 27 halophilic bacteria identified, only 6 would grow in the 5 percent NaCl medium at 35° C.; all 27 grew in the 5 percent medium at 27° and 22° C. These bacteria were mainly Flavobacteria. The Brevibacteria grew at NaCl concentrations of 10 percent and above; at 35° C., six of the strains were unable to grow in less than 10 percent NaCl. The growth of organisms from both genera was affected by temperature as well as salt concentration--optimal salt concentrations for at least 12 strains decreasing as the temperature was lowered. [3 figures, 1 table, 8 references] LB

2.05 (3.9) GROWTH AND TOXIN FORMATION OF CLOSTRIDIUM BOTULINUM TYPE E IN RAKEFISH [FERMENTED FISH PRODUCT] AT VARIOUS TEMPERATURES

Tjaberg, Tore B., O. M. Vstgaard, and A. Skulberg (Norges Landbrukshoegsk, Norway)
Chemical Abstracts 72, No. 16, 53811h (March 16, 1970)

0.4 (9.19) EFFECT OF CHLORINATED HYDROCARBONS IN THE DIET ON THE TOXICITY OF SEVERAL ORGANOPHOSPHORUS INSECTICIDES

Menzer, R. E. (Department of Entomology, University of Maryland, College Park 20742)
Toxicology and Applied Pharmacology 16, No. 2, 446-452 (March 1970)

Dieldrin fed to white mice at 5 to 25 p.p.m. for 7 or 14 days decreased the toxicity of Bidrin (dimethyl phosphate, ester with cis-3-hydroxy-N,N-dimethylcrotonamide) and phosphamidon (dimethylphosphate, ester with 2-chloro-N,N-diethyl-3-hydroxycrotonamide), both vinyl phosphates with substituted amide moieties; increased the toxicity of dimethoate (O,O-dimethyl S-(N-methylcarbamoylmethyl) phosphorodithioate) about twofold; and slightly decreased the toxicity of malathion (diethylmercaptosuccinate, S-ester with O,O-dimethylphosphorodithioate). DDT (chlorophenothane) fed to white mice at 25 or 100 p.p.m. had no significant effect on the toxicity of phosphamidon, slightly decreased the toxicities of Bidrin and malathion, and slightly increased the toxicity of dimethoate.
[1 table, 25 references] FTP

0.5 (7.0) CHROMATOGRAPHY OF MOLD METABOLITES I. APLATOXINS, OCHRATOXINS AND RELATED COMPOUNDS

Fishbein, L., and H. L. Falls (National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina, U.S.A.)
Chromatographic Reviews 12, No. 1, 42-87 (January 1970)

This review of the literature describes the chromatography of mold metabolites of major importance as potential health hazards for man, stressing the procedures for their isolation, identification, and study of their metabolic pathways. [Numerous figures of structures of compounds, 17 tables, 205 references] FTP

0.6 (8.50) GAS CHROMATOGRAPHIC AND MASS SPECTRAL ANALYSES OF SOYBEAN MILK VOLATILES

Wilkens, Walter F., and Fang M. Lin (Department of Food Science and Technology, New York State Agricultural Experiment Station, Cornell University, Geneva, N.Y. 14456)
Journal of Agricultural and Food Chemistry 18, No. 3, 333-336 (May-June 1970)

Soybean milk has been prepared in the Orient for hundreds of years as follows: the beans are soaked in water for several hours and then they are ground in water; the material is filtered and finally cooked for about 30 min. Whole-fat soybean milk tends to develop a beany-rancid flavor during its production. The purpose of the present study was to isolate and identify the volatile compounds from whole-fat soybean milk. The volatile components were isolated and identified by use of gas chromatography and mass spectrometry.

Forty-one volatile compounds were positively identified and thirteen others were tentatively identified. Hexanal was the major volatile component of soybean milk. [6 figures, 1 table, 34 references]

0.6 (2.3)(3.20) PROCESS MODELING & OPTIMIZATION. 3. OPTIMIZATION

Harper, J. M., and L. A. Wanninger, Jr. (General Mills Inc., James Ford Bell Technical Center, 9000 Plymouth Avenue North, Minneapolis, Minnesota 55427)
Food Technology 24, No. 5, 82-83, 86-87 (May 1970)

Parts 1 and 2 of this three-part series deal with the development of mathematical models of a food process. This part 3 presents an approach and techniques that are workable and useful in optimizing food processes. [An optimization problem is one that seeks to maximize (or minimize) a numerical (objective) function of a set of variables. Each of the variables in the function is subject to constraints. Optimization, then is the method for maximizing (or minimizing) the function while satisfying all the constraints on the variables.]

The authors demonstrate how to use a mathematical model of a food processing system to improve the operation of the food process. The optimization problem is stated; then the problem is solved by a linear programming technique that yields the optimal operating conditions. Two examples are given: one involves a cereal formulation problem and the other a cereal toasting process problem.
[3 figures, 5 references]

0.6 REMOVING OXYGEN FROM A PACKAGE BY GAS DISPLACEMENT

Hu, Kwoh H., and Jacob D. Breyer (Engineering Sciences Division, General Equipment & Packaging Laboratory, U.S. Army Natick Laboratories, Natick, Massachusetts)
Food Technology 24, No. 6, 81-84, 85 (June 1970)

Some packaged foods keep better if the oxygen is removed from the space within the sealed package. Two methods commonly used commercially are as follows: (1) The filled package is placed in a closed chamber, the air in the chamber is removed by a vacuum pump, the vacuumized chamber is filled with carbon dioxide or nitrogen (the second and third steps may be repeated), then the package is sealed. (2) The filled package is placed in a closed chamber, air in the chamber is removed by a vacuum pump, and then the package is sealed. In order to achieve more efficient and economical removal of oxygen from the package and to reduce the stress on packages (caused by the high degree of vacuum required), the researchers examined the use of gaseous materials in the liquid or solid state.

Four gaseous materials were used: (1) carbon dioxide in the solid state and (2) octafluorocyclobutane, dichlorodifluoromethane, and pentafluorochloroethane in the liquid state. The food products tested were freeze-dried beef and rice, freeze-dried pork loin, and freeze-dried carrots. The packaging pouch was a laminate of 0.0005 in. Mylar A/0.00035 in. aluminum foil/0.003 in. polyolefin.

The workers demonstrated that solid carbon dioxide and the three liquid halogenated hydrocarbons can displace air from a package even without the application of vacuum. Liquid nitrogen did not possess this capacity, probably due to the high velocity of the gas in the package.
[2 figures, 5 tables, 5 references]

0.6 (9.2) ELEVEN STEPS TO LOW COST PRODUCT DEVELOPMENT

Mattson, Peter (Schilling Division, McCormick & Co., San Francisco, California)
Food Product Development 4, No. 4, 106, 108, 118 (June-July 1970)

New food products can be developed inexpensively. Four principles must be adopted to minimize development costs per new product: (1) if at all possible, do not commit any capital, funds, and organizational time; (2) enlist the technical resources of outside firms; (3) do not overdo secrecy--rely instead, if needed, on secrecy agreements (Secrecy is important in developing new products, but it must not deny to you readily available technical information.); and (4) stop if it appears that the product being developed will require an extraordinary amount of resources for research or implementation.

The eleven-step process that can be used to introduce new products for less than $15,000 are: (1) Generate ideas (the "Delphi Method" is one way.); (2) Reduce, by concept screening, the number of ideas to one or two; (3) Develop a preliminary formulation using the services supplied by suppliers of the raw materials; (4) Use taste panels to provide the basis for judging the formulas; (5) Complete the final formulation; (6) Carry out a trial placement test with potential consumers; (7) Adjust the formula on the basis of consumer trial testing; (8) Design an appropriate package, (9) Consider a copacker, or outsider packer, if the product developed cannot be manufactured by your own firm; (10) Carry out a limited market test; and (11) Contract out the production and the distribution of the product.

0.4 ORIGINS OF MOLECULAR BIOLOGY
(9.10)

Hess, Eugene L. (Molecular Biology Section, National Science Foundation, Washington, D.C. 20550)
Science 168, No. 3932, 664-669 (May 8, 1970)

In this article, the author proposes to show that the roots of the molecular approach to biology penetrate the past more deeply than many appreciate. The term molecular biology originated before 1945, in the mind of W. T. Astbury, Professor of Biomolecular Structure at the University of Leeds. Astbury's approach to understanding of living systems was through search below large scale manifestations of classical biology for the corresponding molecular plan. An indispensable condition for the development of molecular biology is the recognition that biological structures are organized on a molecular basis. [78 references] FTP

0.6 MAJOR VOLATILE COMPONENTS OF THE BASIC FRACTION
(8.50) OF HYDROLYZED SOY PROTEIN

Manley, Charles H., and Irving S. Fagerson (Department of Food Science and Technology, University of Massachusetts, Amherst 01002)
Journal of Agricultural and Food Chemistry 18, No. 3, 340-342 (May-June 1970)

Vegetable protein hydrolyzates are used in fabricated food products. In the present study, the major volatile components in the basic extracts of hydrolyzed soybean flour were identified. Gas chromatography and mass spectrometry techniques were used to isolate and identify the volatile components.

Alkylated pyrazines were the major volatile components of the basic extract of hydrolyzed soybean protein. Ten pyrazines were positively identified. Also identified were p- and m-cresol, 5-methyl furfural, benzaldehyde, and o-methoxy phenol. [2 figures, 1 table, 15 references] FTP

0.6 [CARCINOGENS IN FOOD]
(3.4)

Tilner, D. J.
Przemysl Spozywczy 23, No. 9, 380-385 (1969)
Food Science and Technology Abstracts 2, No. 4, 464, 4C103 (April 1970)

This review deals with methods of analyzing carcinogens in foods and with 3,4-benzopyrene in smokehouse smoke, smoked food products, spit-roasted and -barbecued meat and fish, fresh sea shellfish, coffee, fruits, vegetables, and cereals. It also treats of air pollution. [60 references] LB

0.6 WHY PACKAGING INNOVATION FAILS
(2.43)(3.238)

Boudin, Arthur (The Commercial Analysts Co., New York, N.Y.)
Food Product Development 4, No. 4, 94, 96, 98, 101 (June-July 1970)

The proliferation of packaging arises not necessarily from a desire to satisfy specific requirements of consumers but rather from the constant need to sell merchandise. Pressure on manufacturers, therefore, to market products in better packages will continue. Consumers express their packaging needs only in general terms--convenience and ease of handling, good storage qualities, tight closures, aesthetic facings, and easy to read directions. How can the manufacturer obtain from the consumer guidance and ideas for new packaging and for reactions that will tell the producer what packaging will be most successful? In this article, the author discusses problems involved in the area of consumer market research and describes several studies involving cases that were successful or were failures.

Although the state of consumer market research is primitive, present techniques are accurate enough to inform the producer whether a package is good or bad. The author offers suggestions to assist the manufacturer in developing a sound packaging research program: (1) Define the packaging problem carefully and clearly, (2) define the market accurately, and (3) consider your market research as an investment rather than an expense. [7 tables] FTP

0.6 RHEOLOGY IN FOOD RESEARCH

White, G. W. (Lyons Central Laboratories, 149 Hammersmith Road, London, W.14, England)
Journal of Food Technology 5, No. 1, 1-32 (March 1970)

This article is a survey of rheology and its application to the food industry. The various areas considered are psychorheology, basic concepts in rheology, instrumentation for research, time-dependent materials, and methods of interpretation. Food rheology is defined as the study of the deformation and flow of the raw materials, the intermediate products, and the final products of the food industry. Psychorheology deals with the relation between consumer preferences and the rheological properties of the foods.

[10 figures, 5 tables, 88 references] FTP

0.5 PHAGE, COLICINS, AND MACROREGULATORY PHENOMENA

Luria, S. E. (Department of Biology, Massachusetts Institute of Technology, Cambridge, Mass. 02139)
Science 168, No. 3936, 1166-1170 (June 5, 1970)

This reprint of the lecture delivered by the author in Stockholm, Sweden, upon his receipt of the Nobel Prize in Physiology or Medicine will be included in Les Prix Nobel en 1969 and in Nobel Lectures (published by the Elsevier Publishing Company). It deals with approaches to certain aspects of cellular regulation that involve macroregulatory phenomena--that is, those phenomena in which functional changes affect some of the major processes of the living cell (for example, the synthesis of ribonucleic acid, deoxyribonucleic acid, or protein; the energy metabolism; or the selective permeability function of cellular membranes). [96 references] LB

0.6 VOLATILE FLAVOR COMPONENTS OF DEEP FAT-FRIED SOYBEANS
(8.50)

Wilkens, Walter F., and Fang M. Lin (Department of Food Science and Technology, New York State Agricultural Experiment Station, Cornell University, Geneva, N.Y. 14456)
Journal of Agricultural and Food Chemistry 18, No. 3, 337-339 (May-June 1970)

Soybeans have a beany odor which adversely affects their use as food for human consumption. The objectionable odor may be counteracted by "oil roasting" or deep fat frying the beans. Deep fat-fried soybeans have a pleasant odor resembling that of roasted nuts. This paper reports on the isolation and identification of some volatile components of deep fat-fried soybeans. The techniques of gas chromatography and mass spectrometry were used.

Forty-nine compounds were identified, including several carbonyls, aromatic compounds, pyrazine, and pyrrole derivatives.

[1 figure, 1 table, 33 references] FTP

0.6 (3.11) KINETICS OF DIMETHYLAMINE NITROSATION IN RELATION TO NITROSAMINE CARCINOGENESIS

Mirvish, Sidney S. (The Eppley Institute for Research in Cancer, University of Nebraska College of Medicine, Omaha 68105)
Journal of the National Cancer Institute 44, No. 3, 633-639 (March 1970)

Dialkylnitrosamines are powerful carcinogens, which are readily produced by the reaction of dialkylamines with nitrous acid. Since both reactants occur in various foods, nitrosamines could be significant human carcinogens. As a preliminary to studies on the formation of nitrosamines in foods and biological systems, it was essential to examine the influence of various factors on this reaction under defined conditions. The formation of dimethylnitrosamine (DMN) is of particular interest, since much information has accumulated about its carcinogenic action, and DMN has been demonstrated to occur in toxic batches of fish meal preserved with nitrite, in Central African alcoholic spirits, and in an edible South African plant. Since nitrosation occurs most readily under acidic conditions, DMN and other nitrosamines could also be produced in the gastric contents during digestion.

The present paper describes a reinvestigation of dimethylamine nitrosation, with the aid of tritiated dimethylamine labeled in the methyl groups, and gives estimates of DMN formation in the stomach and during food storage.

At pH 3.4, the rate of DMN formation was proportional to the dimethylamine concentration and to the square of nitrite concentration. The rate of reaction

(over)

0.7 (0.6) INTERRELATIONSHIPS OF THE PROTEIN AND AMINO ACID CONTENTS OF INBRED LINES OF CORN

Davis, Leon W., Woodie P. Williams, Jr., and Lynn Crook (Department of Food Science and Biochemistry, Clemson University, Clemson, South Carolina 29631)
Journal of Agricultural and Food Chemistry 18, No. 3, 357-360 (May-June 1970)

The development of inbred lines of corn of high nutritional quality requires determination of total protein and amino acids in hundreds of samples. Even with present automated methods, analyzing large numbers of corn samples is impractical. A real need exists for evaluating the nutritional potential (protein and amino-acid content) of inbred corn and for simpler methods of screening large numbers of samples of corn. In the present study, an examination was made of the interrelation among the contents of 17 amino acids in inbred corn by means of an automatic amino-acid analyzer. One hundred and fourteen samples of inbred corn were examined.

Judged on the basis of the average total protein (nitrogen × 6.25) and amino-acid content, the 114 samples of inbred corn showed a potential quality (as a source of protein for monogastric animals) not much better than ordinary hybrid corn. This observation held true even though 25 of the inbred lines had lysine concentrations greater than 0.45 percent (whole sample basis). [4 tables, 9 references]

0.7 (6.193) DISTILLERS DRIED SOLUBLES AS A SOURCE OF UNIDENTIFIED GROWTH FACTORS REQUIRED BY THE CHICK AND POULT

Dixon, Terence, and J. R. Couch (Department of Poultry Science, Texas A&M University, College Station, Texas 77843)
Poultry Science 49, No. 2, 393-401 (March 1970)

Substances exist that enhance the growth of young chickens and turkey poults fed rations adequate in all known nutrients. Stelzner (1961) isolated two such highly concentrated substances from distillers dried solubles but did not identify them. The purpose of the present study was to characterize and identify the two fractions previously isolated by Stelzner.

One fraction was soluble in isopropyl alcohol; the other was not. The isopropyl alcohol fraction contained phenolic acids, which were identified and their concentrations estimated. The isopropyl alcohol fraction appeared to contain the salt of a carboxylic acid, probably a dicarboxylic acid with the empirical formula $C_{16}H_{19}O_5$.

The growth-producing response of the phenolic acids was tested with chicks. A statistically significant growth response was evident when the phenolic acids were fed to the chicks at levels calculated to be supplied by 5 and by 10 percent distillers dried solubles. [4 figures, 3 tables, 21 references]

1.85 INTERNATIONAL SHRIMP INDUSTRY

Anonymous
Fish Boat 15, No. 6, 155 pp. (June 1970)

This issue of the journal is an in-depth report of the shrimp industry throughout the world. The significance of the industry is discussed, including its contribution to and its place in the whole range of worldwide fisheries. Also included are feature reviews on the place occupied by the United States in the industry; the rapidly expanding shrimp industry in India (whose total catch is second only to that of the United States); the developing industry in South America, especially in Brazil and Colombia; the problems that have beset the declining shrimp industry in Mexico and some of the steps that are being taken to solve them; and the emerging shrimp industries in Africa, the Persian Gulf, the Far East, and the Caribbean.

In compiling this survey, the staff of The Fish Boat visited many countries, talking to industry representatives and government officials in an effort to obtain the most comprehensive picture possible. Many of the current pertinent data so profusely used throughout the issue were obtained from the Foreign Fisheries, Domestic Fisheries, and Statistics and Market News offices of the U.S. Bureau of Commercial Fisheries. [5 maps, 75 photographs, 19 tables]

0.7 USE OF FISH AND SEA PRODUCTS IN NUTRITION

Berezin, N. T.
Trans. of mono. Pishchevoe Ispolzovanie Ryby i Moreproduktov, Moscow, 54 pp. (1967)
U.S. Government Research and Development Reports 70, No. 7, 40 (April 1970) Available from the Clearing House for Federal Scientific and Technical Information, 5285 Port Royal Road, Springfield, Virginia 22151. SFCSI-Int (TT-69-55095). Price $3.00.

The pamphlet contains information on the chemical composition and nutrient value of fish, marine mammals, and invertebrates (crabs, prawns, oysters, mussels, scallops, squids, etc.) for engineers and technologists. The proteins of the flesh of marine animals with their amino acids composition and nutrient and commercial values are discussed. Information is given on methods of evaluating the nutrient and food values of the proteins, and the role of fish as a source of complex animal proteins. The characteristics of fish fats and fish oils are discussed, and their importance in nutrition, and their dietetic properties. Data are given on the vitamin and mineral levels in the tissue of marine animals.
[Author's abstract]

0.8 HANDBOOK OF OCEAN AND UNDERWATER ENGINEERING
(9.6)(2.12)(9.11)

Myers, John J., et al. (ed.)
International Marine Publishing Company, 1,100 pp. (n.d.) $32.50
National Fisherman 51, No. 2, 9S (June 1970)

This book brings together a huge mass of practical information valuable to engineers, scientists, and technicians who are concerned with designing, installing, or operating equipment, systems, or structures in the ocean. Its emphasis is on the practical application of the information, providing answers to the tough how-to-do-it-at-sea questions. The section heads are as follows: Basic Oceanography; Basic Hydrodynamics; Underwater Fields and Instrumentation; Tools, Rigging, and Machinery; Underwater Cables; Underwater Power Sources; Materials and Testing; Fixed Structures; Vessels and Floating Platforms; Diving; Ocean Operations; and Wind and Wave Loads. [673 illustrations] LB

1.0158 FISHERY BOOM FOR SOUTH VIETNAM?
(2.12)

Loftas, Tony
New Scientist 46, No. 700, 280,282-283 (May 7, 1970)

An FAO (Food and Agriculture Organization of the United Nations) mission recently discovered large stocks of fish off South Vietnam that could bring considerable economic and nutritional benefits to the country. [4 figures] FTd

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0.7 GROWTH PROMOTERS

Japanese Patent 31144/69
Toyama Chem. Co. Ltd. (pat.)
Food Technology 24, No. 6, 70 (June 1970)

The growth promoting properties of animal feeds are improved by the addition of 3-di(hydroxymethyl)amino-6-(5-nitro-2-furyl ethenyl)-1,2,4-triazine. FTp

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0.6 BIOLOGICAL DYNAMICS
(9.6)

Weissman, Michael H. (Biotechnology Program, Carnegie-Mellon University, Pittsburgh, Pennsylvania) (reviewer)
Elementary Rheology, xii + 160 pp., $5.50. (Academic Press, New York, 1969)
G. W. Scott Blair
Science 168, No. 3936, 1194 (June 5, 1970)

The reviewer says that although this book is admirably suited for persons having no knowledge of rheology, its appeal is to a much wider readership than that. He himself was introduced to psychorheology through reading the descriptions the book contains; the measurement of such subjective material properties as body, texture, toughness, and spreadability is mentioned. The book ends with an appendix describing the theoretical bases for more than a dozen common viscometric methods and a reading list to which the author has added his appraisal of each entry. The book is illustrated. LB

0.6 was maximal at about pH 3.4. The relative constancy of the appropriate rate constants under various conditions confirmed the third-order kinetics of the reaction, though discrepancies were apparent at pH 1-2. The rate constants were used to estimate the amount of DMN expected to be formed in the gastric contents after ingestion of food containing various concentrations of dimethylamine and nitrite and during storage of such food. For example, it was estimated that, if a man ate a 300-g. meal containing 12 mg. dimethylamine hydrochloride and 60 mg. sodium nitrite, not more than about 3µg. DMN might be expected to be formed intragastrically.

Before deciding whether intragastric nitrosation is of importance in human carcinogenesis, a detailed study of nitrite and secondary amine concentration in foods is clearly necessary. It is important to find out whether nitrite concentrations ever exceed 200 p.p.m., for example, in brines used for pickling fish and meat. Nitrosamine formation should be suspected particularly in foods stored under mildly acidic conditions.

The formation of nitrosamines other than DMN could be a more serious problem than that of DMN itself, since the rate of nitrosation increases 1000-fold as the basicity of the amine decreases on proceeding from dimethylamine to aromatic amines such as N-methylaniline. [1 figure, 2 tables, 26 references]

0.7 GROWTH PROMOTERS

British patent 1,174,564
Willows Francis Ltd. (pat.)
Food Technology 24, No. 6, 70 (June 1970)

These growth promoting substances contain ganglic acid or its salts. FTp

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0.7 GROWTH PROMOTER

British Patent 1,174,951
Kuhlmann, U. (pat.)
Food Technology 24, No. 6, 70 (June 1970)

Sodium phosphocreatinine is added to animal feeds. FTp

1.8 THE MARKETING OF SHELLFISH
(9.6)

Nowak, W. S. (Economics and Marketing, City of London College, London, England)
Fishing News (Books) Ltd., 110 Fleet Street, London, E.C.4, England (publisher).
300 pp. (1970). £4.10.0 plus postage.
Fishing News No. 2973, 8 (June 5, 1970)

Part I - The Factors Which Influence Demand in Britain and Other Countries.

Chapter 1. Demand in Britain. The factors that influence the demand for oysters, whelks, mussels, cockles, and crustaceans are discussed: the season, size and weight, quality, processing, advertising, and marketing techniques.

Chapter 2. Factors Affecting Supply and Market Efficiency. Among the topics covered are: organization of the industry, fishing cooperation, labor methods, hatcheries, price structure, grading practices, storage, packaging, transportation, canning, specialty products, and byproducts of the shellfish industry.

Chapter 3. Legal Limitations Controlling Shellfish Supply in Britain. Herein are discussed early shellfish laws, sea fisheries committees, ownership and fishing right, resource conservation, poaching and trespass, regulations concerning gear and size, shellfish subsidies, and territorial limits.

Chapter 4. Quality Control Techniques in Britain Compared With Those Abroad. Treated here are pollution, shellfish purity, purification costs and methods, sterilization, and geographical distribution of cleansing tanks.

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1.9 SEASONAL AND GEOGRAPHIC CHARACTERISTICS OF FISHERY RESOURCES.
(1.0114) CALIFORNIA CURRENT REGION--II. PACIFIC SAURY

Kramer, David, and Paul E. Smith (Bureau of Commercial Fisheries, Oceanography Center, La Jolla, California)
Commercial Fisheries Review 32, No. 6, 46-51 (June 1970)

Data of the California Cooperative Oceanic Fisheries Investigations (CalCOFI) indicate that major centers of the spawning populations of the Pacific saury can first be located in January in a relatively small area about 150-200 miles offshore from southern California and northern Baja California.

It can be assumed from egg data and visual observations (Smith, Ahlstrom, and Casey, 1970) that the saury ranges at least from southern Baja California to the Gulf of Alaska. The CalCOFI pattern does not delimit saury spawning.... But a survey by BCF's Honolulu Laboratory in spring 1956...and the NORPAC survey in late summer (August) 1955...showed that spawning extends at least to 180° W. longitude. Smith, Ahlstrom, and Casey have stated that spawning probably occurs completely across the Pacific. From data for 2 months of peak spawning--April and May--Smith, Ahlstrom, and Casey estimated the spawning resource at about 500,000 tons in the CalCOFI area. Saury eggs found outside the pattern, as noted above, indicate that there may be as much spawning out of the pattern as in it--and thus would increase the estimate of resource size possibly by an equal amount.

Smith, Ahlstrom, and Casey pointed out that the saury is not likely to be available to the fisherman in the CalCOFI survey pattern during its spawning cycle. Their data from visual observations during spawning and nonspawning periods indicate that the saury might be most available during September through December

(over)

2.01 SYMPOSIUM ON BACTERIAL SPORES
(3.30)(3.11)

Journal of Applied Bacteriology 33, No. 1 (March 1970)

"Arrest of Growth from Spores in Semi-preserved Foods," by C. L. Duncan (Food Research Institute and Department of Bacteriology, University of Wisconsin, Madison 53706), pp. 60-73.

Although control of spoilage in a semipreserved food would seem to depend largely on the inhibition of the outgrowth of bacterial spores, it actually may also be exercised at the level at which germination begins. Evidence indicates that spoilage in nonsterile, canned, cured meats, for example, may be arrested at both the initiation and the outgrowth stages. Whether activation--that is, the reversible process that conditions a bacterial spore for germination--is also affected is not clear. In this paper, the author interprets some of the information available concerning the factors that contribute to the stability of semipreserved foods as these factors are related to the arrest of growth from bacterial spores. He emphasizes the preservative system of nonsterile, canned, cured meats.
[1 figure, 2 tables, 48 references]

Among the other papers presented at the symposium are:

"Biochemical Studies of Spore Core and Coat Protein Synthesis," by James A. Spudich, pp. 25-33. [4 figures, 3 tables, 16 references]

"Germination and the Problem of Dormancy," by G. W. Gould, pp. 34-49. [3 figures, 2 tables, 60 references]

"Germination and Outgrowth: Effect of Inhibitors," by V. Vinter, pp. 50-59. [82 references]

(over)

2.01 STUDIES ON BACTERIOPHAGES OF PSYCHROPHILIC FISH SPOILAGE BACTERIA

Delisle, A. L. (Amherst University, Mass.)
Dissertation Abstracts International. Section B. The Sciences and Engineering 30, No. 2, 754-755 (1969)
Food Science and Technology Abstracts 2, No. 4, 578, 4R139 (April 1970)

From sewage, fish-pier water, and haddock fillets, the author isolated 180 phages active against psychrophilic fish-spoilage bacteria. Most formed plaques at 2° C. or 20° C. and attacked either marine or terrestrial forms; most were not strain or species specific. This lack of specificity precluded their being used for phage typing psychrophilic pseudomonads or for differentiating between marine and terrestrial types. In contrast to the general lack of specificity, phages for Pseudomonas putrefaciens showed considerable species specificity, so phage typing in this case seems to be feasible. These phages may be either facultatively or obligately psychrophilic. Temperature was found to influence both burst size and latent period; in some cores, it also affected the efficiency of plating, adsorption, and host-controlled modification and restriction.

2.05 AN EVALUATION OF THE SALMONELLA PROBLEM
(0.5)

Foster, E. M. (Food Research Institute, University of Wisconsin, Madison, Wis.)
Food·Drug·Cosmetic Law Journal 25, No. 2, 60-64 (February 1970)

In this article, the author highlights the Report of the Salmonella Committee of the National Academy of Sciences (National Academy of Sciences Publication No. 1683, June 1969, 207 pp.). He emphasizes four areas: (1) the seriousness of the problem, (2) control measures by the industry and the regulatory agencies, (3) needs for education and training, and (4) needs for research. FTP

2.01

"Heat Resistance of Spore Enzymes," by H. L. Sadoff, pp. 130-140. (5 figures, 3 tables, 32 references]

"Radiation Resistance of Spores," by A. Tallentire, pp. 141-146. [17 references]

"The Sporicidal Properties of Chemical Disinfectants," by G. Sykes, pp. 147-156. [5 figures, 2 tables, 15 references]

"Problems in Thermal Processing," by K. Vas, pp. 157-166. [6 figures, 35 references]

"Sporeformers as Insecticides," by J. R. Norris, pp. 192-206. [8 plates, 61 references]

"Some Factors Influencing the Survival of Freeze Dried Yeast Cultures," by D. Rose, pp. 228-232. [1 figure, 1 plate, 4 tables, 7 references]

"Assessment of the Stability of Pasteurized Comminuted Meat Products," by J. H. H. Mol and C. A. Timmers, pp. 233-247. [8 tables, 18 references]

"The Effect of Carbon Dioxide on Spore Germination in Some Clostridia," by Diana Holland, A. N. Barker, and J. Wolf, pp. 274-284. [10 figures, 14 references]

2.06 BATTER-COATED MEAT PRODUCT

Canadian Patent 823,139
Miller, A. E., P. F. C. Sale; Unilever Ltd. (pat.)
Food Technology 24, No. 1, 48 (January 1970)

Cubes of meat are coated with a batter containing a carbon dioxide inflating agent. A rounded or spheroidal product form is produced when the coated meats are cooked. FTP

1.01 PROBLEMS OF WORLD OCEAN FISHERIES
(9.2)

Martinsen, G. V.
Trans. of Okeanologiya (USSR) 9, No. 6, 1049-1055 (November-December 1969)
U.S. Government Research and Development Reports 70, No. 10, 21 (May 25, 1970)
Available from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151. Publication No. JPRS-50077. Price $3.00.

Data are given describing the geographic location of modern fisheries according to oceans, continents and nations. The makeup of the world catch is given and evaluations are published by individual scientists on the possible annual catch in the world's oceans. (Author)

1.8

Part II - Shellfish Marketing in North America.

Chapter 5. Study of the Industry in the United States. The author's analysis deals with the sources, preparation, processing, distribution, marketing, and utilization of shrimp, crab, lobster, crawfish, oyster, clam, mussel, scallop, abalone, squid, and minor shellfish products.

Chapter 6. Canadian Shellfisheries. Since the Canadian industry is centered on export, this chapter covers marketing and quality control in detail.

Chapter 7. Mexico Shellfisheries--An Example of Rapid Development. Mexico's success in building a successful trade in abalone, oysters, turtles, minor shellfish, crabs, spiny lobsters, and especially shrimp is described.

Chapter 8. Trends in the Shellfish Industry. Some of the trends likely to affect the marketing of shellfish are: better gear, potential aquaculture, and modern methods of marketing, preservation, and distribution.

In addition to indices and a bibliography, the book has 58 illustrations.

1.9

and, most likely, in the areas from San Diego to northern California and Oregon--with the maximum numbers 40 miles and more offshore. Novik and Kulikov (1966), in their account of Russian surveys off the west coast of North America, reported that the most dense concentrations of adult saury were between latitudes 42°18' and 44°22' in August, October, and November at water temperature 54°-55° F. (12.5-13.5° C.). [5 figures, 4 references]

1.56 EXPERIMENTAL SABLEFISH FISHING OFF SAN DIEGO, CALIFORNIA
(1.0114)

Phleger, Charles F., Nils Schultz, Andrew Soutar, and Erich Duffrin (Scripps Institution of Oceanography, La Jolla, California 92037)
Commercial Fisheries Review 32, No. 6, 31-40 (June 1970)

The sablefish (or black cod, seatrout, skilfish, beshow, coalfish, butterfish, candlefish), Anoplopoma fimbria, has been fished commercially by civilized man on the western coast of North America since the middle of the nineteenth century (Pacific Marine Fisheries Commission, 1954). The fishery, extending from Southern California (Newport Beach) to Alaska, has mostly been a secondary product of the Pacific Coast halibut fishery, along with ling cod (Ophiodon elongatus) and red cod (Sebastodes ruberrimus). It is of special importance during the winter closed season for halibut (Thompson, 1941). It is fished by longline gear and otter or balloon trawls (Phillips, 1958).

Our results provide evidence that sablefish populations are extensive off San Diego and the offshore islands. These fish represent an underfished resource in this area. We feel that they can be fished economically through some form of free-vehicle technique. [4 figures, 6 tables, 10 references] [Reprinted in part]

2.05 THE DETECTION OF CLOSTRIDIUM BOTULINUM TYPE E IN SMOKED FISH PRODUCTS IN THE PACIFIC NORTHWEST
(3.4)

Hayes, Sidney, James M. Craig, and K. S. Pilcher (Department of Microbiology, Oregon State University, Corvallis)
Canadian Journal of Microbiology 16, No. 3, 207-209 (March 1970)

In 1968, the authors found that Clostridium botulinum type E or its toxin occurred in a significant proportion of the salmon and other marine fish taken from coastal waters of the Pacific Northwest. In view of these findings, they decided to examine various smoked-fish products produced in this geographical area. Accordingly, they analyzed 240 samples (produced by 28 processors) of smoked salmon, sturgeon, black cod, tuna, halibut, perch, herring, and other fish purchased at various retail outlets along the Washington-Oregon coast. They found that 19.6 percent of the samples yielded culture filtrates that were toxic to mice. Type E botulinal toxin was identified in 4.6 percent of the samples; no other type of botulinal toxin was found. Three of the samples yielded pure cultures of the organism.

The authors conclude that smoked fish products of the sort examined could constitute a health hazard if storage conditions for the product are conducive to bacterial growth. [1 table, 8 references] LB

2.1113 MICROBIAL DECOMPOSITION OF FISHING COTTON IN A MARINE ENVIRONMENT

Maciejowska, Modesta (Morski Instytut Rybacki, Gdynia, Polska)
Postępy Mikrobiologii 8, No. 1, 137-141 (1969)

The microbial decomposition of cellulose in a marine environment was studied because many fishing tools made of cotton are still used in the Polish fishing industry. Fishing cotton twine and filter paper were submerged in Gdańsk Bay (an arm of the Baltic Sea), an area characterized by brackish waters and large fluctuations of temperature and oxygenation. Microbial decomposition of cellulose was determined by the loss of strength of the twine (using Schopper's apparatus), and by the loss of weight of filter paper samples.

The most intensive decomposition of cellulose occurred in the bottom layers of the sea (Fig. 1). After 65 days of exposure, the loss of strength was 90 percent in bottom layers, and only 60 percent in surface layers of the sea. The temperature of water had a pronounced effect on the deterioration of the cellulose. The summertime sea water was the most deleterious for fishing cotton twine and gave about five times faster decomposition of cellulose than the springtime sea water.

Microscopic examination of samples showed an extensive corrosion of cellulose fibers.

Microorganisms found on the samples were from the groups of Eubacteriae and Myxobacteriales. [5 figures]

(over)

P. P. Lewicki

2.116 MARINE RADIO AND ELECTRONICS
(9.6)

Lytel, Allan
International Marine Publishing Company, 253 pp. (n.d.) $7.00
National Fisherman 51, No. 2, 4S (June 1970)

This book covers the subject not only for fishermen but for commercial, pleasure-boat, and merchant-marine operators. It describes many electronic devices by telling what they do and how they should be operated. Included is a list of marine frequencies and of marine electronic equipment manufacturers. The chapter headings are as follows: Marine Radio and Electronics (including radar, radio direction finders, and depth sounders), Using the Small Boat Radio, Two-Way Radio Telephone--Medium- and High-Frequency, Two-Way Radio Telephone--Very-High- and Ultra-High-Frequency, Citizens' Band Radio Telephone, Two-Way Radio Telephone Installation and Maintenance, Deep-Water Radio Telephone, Radio Telegraph at Sea, Radar and Loran, Radio Direction Finder, Depth Finder, Other Marine Electronics (including gyro compass), and Electronics and the FCC and U.S. Coast Guard. [Over 100 photographs and diagrams]

LB

2.1121 FISHING THE "SUPER" TRAWL

Muschkeit, Werner
World Fishing 19, No. 3, 40-41 (March 1970)

In this Part 1 of a two-part article the author, a Bremerhaven trawler captain, describes the rigging and handling of the "super" trawl. He used the net first for catching herring, then later for redfish. Redfish can be found at about 400 fathoms. The super trawl has been fished as deep as 370 fathoms.

The super trawl is a 1,114-mesh net, with a mesh size in the fore part of 22 inches. The trawl door has an area of 129 sq. ft., with 68-fathom upper and lower bridles and with 2,750-lb. weights between the bridles and wings. Four hundred pounds of chain ballast was fixed at four points on the footrope and 120 to 200 plastic sphere headline floats were used. This combination worked well except when fishing in shallow water near the bottom. The trawler captain had made several changes in the original arrangement of the rigging. The trawl warp, for example, was shackled to the fourth towing point of the trawl door crossbar and the fore sections of the bridles were attached independently to the doors. Also, the pennants were rigged separately and not shackled together. [1 figure]

PART TWO--CONTROLLING DEPTH. Ibid. No. 4, 20-21 (April 1970).

The super trawl (about 660 ft. long) is designed primarily for white fish. In practice, the author has found it best to aim for a vertical opening of 131 ft. for this net, giving it a width of over 164 ft. In medium weather conditions, such an opening can be obtained with a propeller thrust of 1,500-1,700 b.hp. Depth control, normally, is achieved by varying engine revolutions. [7 illustrations, 1 diagram]

FTP

2.117 FLOTILLA FISHING IN THE GDR [GERMAN DEMOCRATIC REPUBLIC]
(2.118)(2.114) FILLING THE FLOATING COD END

Anonymous
World Fishing 19, No. 3, 44-45 (March 1970)

In the February issue of the journal, the system of operation of the "flotilla" fishing fleet of the GDR was described. A key operation in this system involves the transfer of fish from the catcher trawler to the processing vessel. The fish are transferred in floating cod ends that carry about 15 tons of fish. The system uses injector-type fish pumps, which can handle round fish (such as cod) up to 4.6 ft. long and flat fish up to 1.3 ft. wide. Ninety tons can be pumped in 3 hours.

Storage time is short on the catcher trawlers. The fish are dumped into storage bunkers from a conveyor. At the same time, sea-water ice is added to the fish by means of a screw conveyor. Fish are drawn from the storage bunkers through an outlet gutter at the base of the bunker. The system ends at either side of the stern ramp, where the cod ends are held over a short outlet pipe for filling. The filled cod ends are secured with a strangler rope. [4 illustrations, 3 diagrams]

FTP

2.1471 DEEPWATER PAIR TRAWLING

Vorobev, I.
Trans. of mono. Glubokovodnyi Bliznetsovyi Lov, Vladivostok, 34 pp. (1967)
U.S. Government Research and Development Reports 70, No. 10, 136 (May 25, 1970)
Available from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151. Publication No. TT-69-55096. Price $3.00.

The booklet deals with the experience of Far Eastern Fishermen, workers of the Far East Experimental Base of Commercial Fishing, in mastering a promising fishing method, namely, deepwater pair (bottom) trawling from SRTR-400 class trawlers. It also discusses the design of trawls used for deep-water fishing, and their rigging, conversion of the vessels, safety procedures, and other problems involved in this fishing method. (Author) FTP

2.119 NAUTICAL CALCULATIONS EXPLAINED
(9.6)

Klinkert, J., and G. W. White
International Marine Publishing Company, 615 pp. (n.d.) $14.00
National Fisherman 51, No. 2, 4S (June 1970)

With the help of formulas and diagrams, this book explains the following: mensuration and hydrostatic pressure; transverse and longitudinal stability; ship performance; speed, fuel, slip, and horsepower; voyage programs: loadlines and chartering, for example; voyage and wage accounts: currency exchange; cargo assessments: bulk oil and general cargoes; cargo equipment; stress calculations; elementary electricity and magnetism: magnetic compass deviation; gyro compass; meteorological assessments; and marine radar navigation. An appendix explains the use of metric units. LB

2.3 EINRICHTUNG ZUM VERSTELLEN DER KÖPFMESSER IN FISCHBEARBEITUNGSMASCHINEN
[ADJUSTING DEVICE FOR HEAD CUTTER IN FISH-PROCESSING MACHINES]

Stascheit, J., and H. Duewel (Institut für Hochseefischerei und Fischverarbeitung)
West German Patent Application 1,429,973 (1969)
Food Science and Technology Abstracts 2, No. 4, 577, 4R129 (April 1970)

The head cutter, which incorporates a head-measuring device connected to the drive shaft, is adjusted axially to the thickness of the fish. Since the device (which was designed especially for use in the herring industry) adjusts quickly and easily to fish size, it reduces cutting waste. LB

2.15 MACHINE FOR SEPARATING NORTHERN SHRIMP, PANDALUS BOREALIS, (1.85) FROM FISH AND TRASH IN THE CATCH

Corbett, Michael G. (Bureau of Commercial Fisheries, Exploratory Fishing and Gear Research Base, State Fish Pier, Gloucester, Massachusetts 01930)
Fishery Industrial Research 6, No. 2, 53-62 (May 1970)

Because of the labor required in separating northern shrimp from the unwanted components of the catch that are taken along with it, this valuable resource in the Gulf of Maine is not harvested to the extent possible. Consequently, a machine was developed to separate the shrimp from the bulk of groundfish and other species taken in trawl catches during exploratory and commercial fishing. Its use eliminates the laborious task of sorting the catch by hand, yet the separator recovers about 95 percent of the shrimp that are fed into it, while eliminating about 90 percent of the trash. [8 figures] Author's abstract

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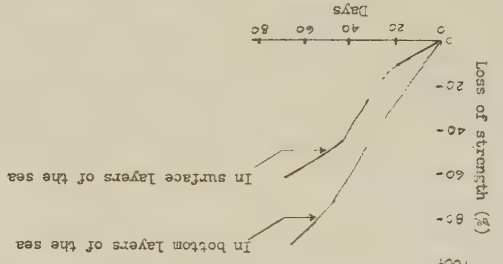
2.1112 NET MAKING
(9.6)

Blandford, P. W.
International Marine Publishing Company, 104 pp. (n.d.) $2.25
National Fisherman 51, No. 2, 4S (June 1970)

This new edition of a book first published in 1941 gives up-to-date information on making nets by hand. Its 10 chapters treat of tools and materials, netting sizes and knots, basic processes, varying flat net shapes, tubular nets and bags, mounting nets, square netting, repairing nets, miscellaneous processes, and things to make. [55 drawings] LB

Fig. 1. Decomposition of cellulose in the sea



2.1113

2.116 FISH FINDING WITH SONAR. PART FIVE--ECHO INTERPRETATION

Anonymous
World Fishing 19, No. 3, 42-43 (March 1970)

The preceding articles of this series discussed the performance of the sonar system. The present paper deals with the practical fishing uses of sonar. Successful fishing may depend upon accurate interpretation of the sonar echo traces. The use of a sonar target reflector is recommended for training purposes and for checking sonar performance and local sea conditions. Diagrams of the sonar reflector and the manner in which it is suspended are given. Several sonar echo traces are presented and explained. [6 figures] FTP

2.115 RECENT DESIGNS OF SEMI-AUTOMATED FISHING VESSELS.
(2.119) PART 2. SHIP AND CREW SAFETY

Doust, David, and J. Logan (Central Design and Drafting Ltd., Montreal, Quebec, Canada)
Fishing News International 9, No. 5, 65-66, 69-70 (May 1970)

Part one of this series, published in the April (No. 4) issue of the journal, discussed the design of an advanced semiautomated stern trawler including the system of fishing and of processing the fish aboard ship. Part 2 considers the design of the fishing vessels in relation to the safety of the ship and crew. FTP
[6 figures, 15 references]

2.3 MACHINE OPENS SCALLOP SHELLS
(1.84)

Anonymous
Fishing News International 9, No. 5, 97 (May 1970)

This article is a summary of a report presented by Richard W. Nelson (Technological Laboratory, U.S. Bureau of Commercial Fisheries, 2725 Montlake Blvd. East, Seattle, Washington, U.S.A.) at the Montreal Conference on Automation and Mechanization in the Fishing Industry. A mechanical device for shucking scallops aboard ship is described. The scallop muscle is removed from the scallop in a four-stepoperation. First a hot flame (approximately 6,000° F.) is applied to one shell. This treatment causes immediate release of the heated shell from the adductor muscle of the scallop. The loosened shell is removed in the second step by physical contact with a breaking bracket. In the third step, the viscera and other soft parts are removed from the remaining portion of the scallop, leaving the adductor muscle and half-shell intact. Finally, the adductor muscle is removed either by a second heat treatment, by hand, or by a mechanically operated scraper. The machine is expected to shuck about 3,600 scallops per hour (an experienced shucker can hand shuck about 600 scallops per hour).

2.43 LAMINATES FOR VACUUM AND GAS PACKAGING
(3.2382)

Douglas, J. A. L. (Pakcel Converters Ltd.)
Food Manufacture 45, No. 4, 46, 48, 49 (April 1970)

Gas or vacuum packaging is used to prevent the spoilage of the food products by oxidation. Vacuum packaging is an efficient method for preventing spoilage of food by oxidation, but it has the disadvantage of placing considerable pressure upon the packaged product. Gas packaging is relatively new and is used successfully for certain food products. One problem involved in gas packaging is determining the effectiveness of the pack (including the residual oxygen content of the atmosphere within the package). [1 illustration]

2.43 FLEXIBLE PACKAGING APPLICATIONS REVIEWED
(3.2382)

Pettit, B. S. (Metal Box Company Ltd., 37 Baker Street, London W1A 1AN, England)
Food Manufacture 45, No. 4, 43-46 (April 1970)

The term flexible packaging covers a broad field of packaging involving a wide range of packaging materials including paper, polymeric materials, and foils. The author discusses the use of flexible packaging materials for food products.

2.3 VORRICHTUNG ZUM MESSEN DER KÖRPERLANGE QUER ZU IHRER LÄNGSRICHTUNG TRANSPORTIERTER FISCHE
[DEVICE FOR MEASURING THE LENGTH OF FISH BEING CONVEYED SIDE FIRST]

Dohrendorf, F. (Nordischer Maschinenbau Rudolf Baader)
West German Patent Application 1,454,093 (1969)
Food Science and Technology Abstracts 2, No. 4, 577, 4R136 (April 1970)

The measuring device consists of (1) several parallel sensors arranged over the heads of the fish, which lie in moving trays, and (2) a controlled lever, which reacts to the number of sensors that are actuated by the size of the fish. The device can be used in conjunction with knives that sever the fish's heads and tails. LB

2.3 [MECHANISM FOR ORIENTING FISH HEAD FORWARD]

Barkov, S. I. (pat.)
U.S.S.R. Patent 245,302 (1969)
Food Science and Technology Abstracts 2, No. 1, 123, Item 01R1 (January 1970)

A rotary disk fixed on a vertical shaft with a stationary flange ring along its circumference is equipped with discharge traps. Horizontal slits in the flange ring have baffle plates, which catch the tails of fish that are wrongly oriented and turn the fish head forward.

2.8 (4.29) ÜBER DIE ERNÄHRUNGSPHYSIOLOGISCHEN EIGENSCHAFTEN VON FISCH-FRITTIERFETTEN. I. EINFLUSS DES FRITTIERENS AUF CHEMISCHE ZUSAMMENSETZUNG UND FUTTER-EFFICIENCY
[PHYSIOLOGICAL AND NUTRITIONAL PROPERTIES OF FAT FOR FRYING FISH. I. EFFECT OF FRYING ON CHEMICAL COMPOSITION AND FEED EFFICIENCY]

Lang, K., E. H. von Jan, and J. Henschel (Physiologisch-Chemische Inst., Johannes-Guttenberg-Univ., Mainz, West Germany)
Zeitschrift für Ernährungswissenschaft 9, No. 4, 363-387 (1969)
Food Science and Technology Abstracts 2, No. 2, 254, Item 2N49 (February 1970)

Soybean oil and hydrogenated groundnut oil were heated in a commercial frier, with and without fish, and maintained at 175° C. for 8 hr. a day for up to 12 days. The iodine value, acidity, fatty-acid composition, KOH value, and viscosity of the oils gradually changed. The growth rate and protein utilization characteristics of white rats fed the oils for as long as 510 days were unaffected by the heat-treated fats. The authors recommend that fats for frying fish be heated to a maximum of 180° C. and that they be completely renewed once a week.
[73 references]

2.3 (1.8) [INSTALLATION FOR SHELL FISH SEPARATION]

Valyavin, I. G., G. I. Potakov, B. N. Tagunov, A. N. Zhogov, and R. K. Shcherbakova (pat.)
U.S.S.R. Patent 248,926 (1969)
Food Science and Technology Abstracts 2, No. 1, 129, Item 01R37 (January 1970)

The patent covers a mechanized installation for heat-treating shellfish. The apparatus has an internal conveyor-belt system and a perforated horizontal drum with a worm conveyor for unloading and separating the meat from the shells. LB

2.3 RECOMMENDATIONS FOR THE SANITARY OPERATION OF PLANTS THAT PROCESS FRESH AND FROZEN FISH

Lane, J. Perry (Bureau of Commercial Fisheries, Technological Laboratory, Emerson Avenue, Gloucester, Massachusetts 01930)
Fishery Industrial Research 6, No. 2, 63-82 (May 1970)

The problem of sanitation in food-processing plants is receiving increasing attention from Federal and State regulatory agencies, as well as private industry. This article covers recommended guidelines that can assist the processors of fresh and frozen fish in evaluating their existing sanitation practices or in establishing new ones. [2 tables, 6 references] Author's abstract

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2.3 (6.54) REMOVAL OF FISH BONES FROM FISH TISSUES BY AN IMPROVED PROCEDURE

Paccione, James D.; Therese M. Laciak (Chicago Bridge and Iron Co.) (pat.)
German Offen. 1,927,115
Chemical Abstracts 72, No. 15, 77662m (April 13, 1970)

2.8 FRYING AGENT

Japanese Patent 23807/69
Dow Corning Corp. (pat.)
Food Technology 24, No. 4, 150 (April 1970)

Nonstick mixtures for use in frying foods consist of phenylmethylpolysiloxanes and alkoxylated short chain alkyl ethers. FTP

2.8 DEEP-FRYING BATTER

British Patent 1,161,358
Food Technology 24, No. 1, 86 (January 1970)

Foods to be breaded and deep-fat fried are coated first with a batter containing oxidized cereal starch that provides superior adhesion for the breading material. FTP

2.8 (4.4) CHANGES IN SOYBEAN OIL AND ITS MIXTURES WITH HYDROGENATED FAT DURING THE COOKING OF FISH

Komarnitskii, M. I. (U.S.S.R.)
Chemical Abstracts 72, No. 16, 53858d (March 16, 1970)

2.9 (1.89)(0.4) MACULOTOXIN, A POTENT TOXIN SECRETED BY OCTOPUS MACULOSUS HOYLE

Freeman, Shirley E., and R. J. Turner (Australian Defence Scientific Service, Defence Standards Laboratories, Melbourne 3032, Australia)
Toxicology and Applied Pharmacology 16, No. 3, 681-690 (May 1970)

The posterior salivary glands of the blue-ringed octopus, Octopus (Hapalochlaena) maculosus Hoyle, contain a neurotoxin that is pharmacologically very similar to tetrodotoxin and saxitoxin. It causes hypotension, bradycardia, and respiratory paralysis in rats and rabbits; the hypotension can be temporarily reversed with l-epinephrine or l-norepinephrine. Respiratory failure after intravenous injection is caused by blockage of muscular nerve axons. In the toad and the rat, it blocks transmission in the sciatic nerve. At low-dose levels, it seems to have a neuromuscular blocking effect; at higher dose levels, the muscle membrane also becomes inexcitable. Affected animals can be revived after a marginally lethal dose by artificial respiration alone provided hypoxia has not become severe.

The authors point out that the occurrence of maculotoxin, tetrodotoxin, and saxitoxin in such phylogenetically different organisms--dinoflagellates, cephalopods, and vertebrates--suggests that these types of poison may be more widely distributed than is now known. [4 figures, 12 references] LB

2.3 MEAT & FISH PRODUCTS

U.S. Patent 3,490,093
Mallas, L., C. E. Hawkins, and B. P. Menzyk; Frigidmeats, Inc. (pat.)
Food Technology 24, No. 6, 64 (June 1970)

The apparatus is designed for high-speed production of ground meat patties. FTP

2.3 FISH PROCESSING

British Patent 1,175,538
(and Canadian Patent 822,201)
Smith, J. (pat.)
Food Technology 24, No. 6, 64 (June 1970)

The apparatus will process fish of various sizes. FTP

2.3 VORRICHTUNG ZUM VEREINZELN UND AUSRICHTEN VON FISCHEN [DEVICE FOR SEPARATING AND ORIENTING FISH]

Bartels, A. (Nordischer Maschinenbau Rudolf Baader)
West German Patent Application 1,454,085 (1968)
Food Science and Technology Abstracts 2, No. 1, 129, Item 01R36 (January 1970)

A vibrating, sloping surface is divided into channels as wide as the fish being processed. The channels have rough inner surfaces that cause the fish to be moved head first toward the upper, discharge end of the channel. Foreign matter and fish in a reversed position move toward the lower end of the orienting surface. There the fish are fed into a return chute by a roller. LB

2.9 EFFECT OF THIAMINASE ON RATS FED NON-RADIATED AND RADIATED CLAMS

Kuo, Guei-ru (Department of Food and Nutrition, Massachusetts University, Amherst, Mass.)
Thesis, 45 pp.
Nuclear Science Abstracts 24, No. 9, 1709 (May 15, 1970)

This investigation was conducted to determine the protein quality of non-radiated thiaminase-active clams (Mya arenaria) and that of thiaminase-active clams radiated at the 0.4 and 0.8 magarad levels with ^{60}Co γ rays, to find out whether 2 mg thiamine · HCl per 100 ml of drinking water are sufficient to prevent thiamine deficiency caused by thiaminase activity in clams and to determine the thiaminase activity in nonradiated, 0.4 megarad radiated, and 0.8 megarad radiated clams. It was established that the protein quality of radiated clams was significantly ($P < 0.01$) lower than that of non-radiated clams and was equal to that of casein. Drinking water containing 2 mg of thiamine · HCl per 100 ml was found to prevent erythrocyte transketolase activity in rats consuming thiaminase-active clams from falling below its normal value. Therefore, no thiamine deficiency occurred in these rats. In the course of this investigation, an improved method of determining thiaminase activity in marine products was developed. This method was used to show that thiaminase activity in clams decreased as radiation dosage increased. (Author)

3.12 SYMPOSIUM ON THE EVALUATION OF THE SAFETY OF FOOD ADDITIVES AND CHEMICAL RESIDUES

Loomis, Ted A., et al.
Toxicology and Applied Pharmacology 16, No. 2 (March 1970)

"Introduction," by Ted A. Loomis (University of Washington, School of Medicine, Seattle 98105), pp. 495-497. The subject of safety in the use of chemicals that are present in or are added to foods will be approached by looking at the role of short-term tests in animals, of prolonged tests in animals, and of tests in human beings.

"The Role of the Laboratory Animal Study of Intermediate Duration for Evaluation of Safety," by Leo Friedman (Massachusetts Institute of Technology, Cambridge, Mass. 02139), pp. 498-506. [1 figure]

"The Role of the Chronic Study in the Laboratory Animal for Evaluation of Safety," by Phillippe Shubik (University of Nebraska College of Medicine, Omaha 68105), pp. 507-512.

"Public Opinions and Attitudes Regarding Additives and Chemical Residues," by Irving Ladimer (National Better Business Bureau, Inc., New York, N.Y.), pp. 513-520.

3.15 PASTEURIZATION OF PACIFIC OYSTERS BY RADIATION: POST-MORTEM CHANGES IN NUCLEOTIDES DURING STORAGE AT 0-2°C

Guardia, Enrique J., and Alexander M. Dollar (College of Fisheries, University of Washington, Seattle, Wash.)
Journal of Food Science 35, No. 1, 22-25 (January-February 1970)

The objectives of this study were (1) to obtain data on the concentration of nucleotides in Pacific oysters (C. gigas), (2) to determine the effects of sexual development and postmortem changes in the nucleotides of the oysters during their storage in ice, and (3) to determine the effect of radiation pasteurization on these changes in nucleotides. Postmortem changes in the nucleotides of fish muscle are intimately associated with the events of rigor, and some of the products of nucleotide degradation may contribute to the flavor of fishery products.

The concentration of nucleotides was higher in the dark tissues of the oyster (2.75 µmoles/g.) than in the adductor muscle of the oyster (1.64 µmoles/g.) The concentration of nucleotides in whole oyster meats (2.87 µmoles/g.) is less than that usually found in fish muscle. Fresh oysters contained adenine nucleotides, inosine monophosphate, uridine triphosphate, guanosine triphosphate, guanosine diphosphate, guanosine monophosphate, and guanosine diphosphate-mannose. The oyster samples collected in the summer showed greater concentrations of nucleotides than those collected in the winter. Inosine monophosphate formed rapidly from adenosine triphosphate during storage of the oysters at 0° to 2° C., while the turnover rate of inosine monophosphate was slow in reflecting a low level of 5′-nucleotidase activity.

(over)

3.18 (0.8) CONTROLLING INDUSTRIAL ODORS

Yocom, John E., and Richard A. Duffee (Research Corporation of New England, P.O. Box 3335, Hartford, Connecticut 06103)
Chemical Engineering 77, No. 13, 160-168 (June 15, 1970)

The complex and often frustrating problem of control of odor can be solved, but should be approached through use of sound engineering principles. Except for the halogen compounds and inorganic compounds of sulfur, phosphorus, selenium, tellurium, and nitrogen, most of the odorous gaseous compounds are of organic nature. The threshold for olfactory detection by humans of certain compounds may be exceedingly low. For example, the odor threshold for olfactory detection of pure ethyl mercaptan is 0.001 p.p.m.

Odorous compounds associated with animal or protein processing plants may include the decomposition products diamines; alkylamines; mercaptans; organic sulfides; butyric, valeric, and caproic acids and higher fatty acids, and aldehydes.

A variety of techniques is available for odor control--oxidation, condensation, adsorption, absorption, and dilution.

The selection of the test method for a particular odor-control problem depends upon the industrial process involved, the chemical and physical nature of the odorous materials, the control technology available, and environmental conditions.

Application of improper odor-control procedures can be costly and, at the worst, may even create a more serious odor problem.

(over)

3.15 INOCULATED PACK STUDIES ON LOW-DOSE IRRADIATED MARINE PRODUCTS: SHRIMP

Ward, B. Q. (Miami Univ., Florida. Rosenstiel School of Marine and Atmospheric Sciences)
Nuclear Science Abstracts 24, No. 7, 1233 (April 15, 1970)
Report available from the Clearinghouse for Federal Scientific and Technical Information, U.S. Department of Commerce, Springfield, Virginia 22151. ORO-3698-3, 15 pp. (November 1, 1969)

Aerobic packs of penaeid shrimp were inoculated with unusually small numbers of spores of Clostridium botulinum type E, were irradiated with doses of 100 and 200 Krads, incubated aerobically at temperatures of 38, 42, 50, and 72° F., were evaluated to determine spoilage, and were periodically tested for the presence of botulinum toxin. Both temperature and radiation effects on shelf life were observed. A radiation dosage of 100 Krad was superior to both unirradiated controls and to 200 Krad packs. Very small numbers of inoculated spores were capable of eventual toxin generation. The question of non-E botulism in pink shrimp persisted. Under aerobic conditions, shelf-life was commercially practical, and safety factors were adequate. (Author)

3.18 STERILIZATION PROCESS

Three tables are given: The first lists the various odors reported by city bureaus, the second lists comparative costs of direct-flame afterburners on rendering-plant emissions with and without heat recovery, and the third lists comparative costs for catalytic and flame afterburners.
[2 figures, 3 tables, 22 references]

3.12 FISH PRESERVATION

German Pending Application 1,817,215
Geigy, A. G. (pat.)
Food Technology 24, No. 5, 62 (May 1970)

Fish are treated with mixtures of organic compounds. FTP

3.15 STERILIZATION PROCESS

U.S. Patent 3,483,005
Urbain, W. M., J. L. Shank, and F. L. Kauffman; Swift & Co. (pat.)
Food Technology 24, No. 4, 150 (April 1970)

Foods are sterilized by subjecting them to relatively low energy ionizing radiation in a pressurized atmosphere of carbon dioxide. FTP

3.2249 (0.6)(9.6) QUALITY AND STABILITY OF FROZEN FOODS

Van Arsdel, W. B., M. J. Copley, and R. L. Olson (ed.)
John Wiley & Sons, Inc., 605 Third Avenue, New York, N.Y. 10016 (1969), 384 pp. Price $19.95.
Reviewed by Maynard A. Joslyn
Food Technology 24, No. 5, 74, 76 (May 1970)

The material in this book is based on the investigations carried out by the U.S. Department of Agriculture Western Regional Research and Development Division during 1952-1962 on storage stability of commercially frozen and packed food products.
FTP

3.15 FOOD CHAIN HYPOTHESES ON THE ORIGIN OF MARINE TOXINS

Hyposanthine, inosine, guanosine, guanine, and uracil formed in the tissues during storage of the oysters in ice. The breakdown of the nucleotides in the oyster meats was not affected by 2 mrads of radiation dose. The amounts of total nucleoside and free bases increased during iced storage of the untreated (not irradiated) and the irradiated oyster samples, but during the latter periods of storage their concentrations were greater in the irradiated samples. Probably the bacteria in the nonirradiated samples utilized the nucleosides and free bases. After 15 days of storage of the oysters, the bacteria count for the untreated samples was greater than 10^6 (bacteria per gram) while the counts for the irradiated samples were less than 10^3. [3 tables, 36 references]

2.9 (3.15)(7.591) RADIATION EFFECT ON CLAM THIAMINASE ACTIVITY AS MEASURED BY AN IMPROVED ASSAY METHOD

Liu, May Chih-mei (Department of Food and Nutrition, Massachusetts University, Amherst, Mass.)
Thesis, 37 pp.
Nuclear Science Abstracts 24, No. 9, 1685 (May 15, 1970)

The Gnaedinger method for determining the activity of thiaminase in fish was modified in several ways in order to increase the precision of the measurement of thiaminase activity. A new method was devised for measuring the 0 time instantaneous rate of thiamine destruction by reaction with thiaminase for not more than 10 minutes. Exponential curves were fitted by a least-square method to thiochrome fluorescence readings corresponding to thiamine remaining after reaction with clam thiaminase. Clam thiaminase activity was expressed as micrograms of thiamine destroyed per minute at 0 time per gram of clam solids. The activity of thiaminase in nonradiated clams and that in clams ^{60}Co γ-radiated at the 0.8 megarad level were found to be equal to 13.4 and 6.1 mcg of thiamine destroyed at 0 time per minute per g of clam solids, respectively. (Author)

3.15 (1.51) RADIOSENSITIVITY OF PROTEOLYTIC ENZYMES OF FISH TISSUES

Siebert, Guenther, and K. Musch (Univ. Hohenheim, Stuttgart, Germany)
Chemical Abstracts 72, No. 15, 77542x (April 13, 1970)

In Japanese; 8 figures, 59 references. LB

2.9 FOOD CHAIN HYPOTHESES ON THE ORIGIN OF MARINE TOXINS

Hashimoto, Yoshiro, and Hisao Kamiya (Laboratory of Marine Biochemistry, Faculty of Agriculture, the University of Tokyo, Bunkyo-ku, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 4, 425-434 (April 1970)

3.2341 SCHNELLFROSTEN VON FISCH IM STICKSTOFFSPRÜHTUNNEL: EIN NEUARTIGES KONSERVIERUNGSVERFAHREN UND SEINE PRAKTISCHE BEWÄHRUNG
[RAPID FREEZING OF FISH IN A NITROGEN SPRAY TUNNEL: A NEW PRESERVING METHOD AND ITS PRACTICAL EVALUATION]

Droscha, H.
Ernährungswirtschaft 16, No. 6, 459-461 (1969)
Food Science and Technology Abstracts 2, No. 5, 723, 5R177 (May 1970)

Before they are shipped in polystyrene containers, fish are processed as follows: the blood is completely washed out; the fish are washed, graded by weight, passed through a liquid-nitrogen tunnel that is kept at -196° C., and film packaged. A Kiel fish wholesaler uses this method for processing fish that are sold ready for cooking.

3.2490 [QUALITY CHANGES IN PRE-PACKED PLAICE FILLETS]
(1.69)

Van Spreekens, K. J. A. (Inst. voor Visserijprodukten TNO, IJmuiden, The Netherlands)
Conserva 18, No. 4, 96-98 (1969)
Food Science and Technology Abstracts 2, No. 2, 281, Item 2R52 (February 1970)

The author determined the aerobe counts, total volatile bases (TVB), hypoxanthine values (HX), and organoleptic changes occurring in plaice fillets stored at from 0° to 2° C. Fresh plaice (caught 2 days before and kept on ice) were stripped and either filleted immediately or filleted after either 4 or 7 additional days on ice. Before being filleted, half the fish were brushed in running water.

Initial counts of fillets from unbrushed fish stored 4 additional days were 10 times more than those from fish filleted immediately; those stored 7 additional days were 100 times more. The shelf life of fillets from fish filleted immediately was from 5 to 7 days; from fish filleted after 4 extra days' storage, 4 days; and from fish filleted after 7 extra days' storage, 1 day. Although initial aerobe counts were slightly reduced by brushing in running water, shelf life was largely unaffected. A TVB content of 15 mg.percent N was the maximum for organoleptic acceptability.

In another experiment, the author tested the effect of filleting under various hygienic conditions. He found that fillets handled under very hygienic conditions had an initial aerobe count 100 times less than fillets handled under normal or unhygienic conditions. [2 references]

3.2495 STUDIES ON MUSCULAR PROTEINS OF FISH.
(0.321)

Arai, Ken-ichi, Hideaki Takahashi, and Tsuneyuki Saito (Laboratory of Biochemistry, Faculty of Fisheries, Hokkaido University, Hakodate, Hokkaido, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 3 (March 1970) (In Japanese; figures, tables, and summaries in English)

III. INHIBITION BY SORBITOL AND SUCROSE ON THE DENATURATION OF CARP ACTOMYOSIN DURING FROZEN STORAGE, pp. 232-236.

Actomyosin extracted from the dorsal muscle of carp was kept frozen at -20° C. or was freeze dried with either sorbitol or sucrose. By measuring changes in the activity of adenosine triphosphatase and in solubility against 0.6 M KCl at a pH of 7.0, the authors determined the required ratio proportions for protecting the actomyosin from denaturation. They found that the sugars (added at three times by weight of the actomyosin) appreciably protected the actomyosin, both freeze dried and frozen stored. Sodium polyphosphate added at 0.3 times the weight of actomyosin had no special effect. [3 tables, 18 references]

IV. ON THE ATP-SENSITIVITY OF ACTOMYOSIN AND MYOSIN OBTAINED FROM CARP MUSCLE, pp. 237-240.

The authors studied the viscosity of carp muscle proteins in order to determine the sensitivity of the adenosine triphosphate (ATP). Although the viscosity of actomyosin and myosin extracted from carp muscle varied from preparation to preparation, the protein concentration and the logarithms of relative viscosity

(over)

3.27 STUDIES ON THE RETENTION OF MEAT COLOR OF FROZEN TUNA.
(3.2491) VIII. DISCOLORATION OF FROZEN MEAT DURING DEFROSTING IN WATER OR AIR

Bito, Masamichi (Tokai Reg. Fish. Res. Lab., Kachidoki, Chuo-ku, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 4, 402-406 (April 1970) (In Japanese; figures and summary in English)

Using three different-sized blocks of frozen tuna meat--3×5×8 cm., weighing about 135 g.; 5×6×11 cm., weighing about 350 g.; and 6×8×14 cm., weighing about 700 g.--the author examined the degree of discoloration caused by thawing at temperatures ranging from 0° to 30° C.

The amount of discoloration in the small blocks that were defrosted in water was about the same at all five defrosting temperatures; that of the medium-sized blocks was slightly lower at 10° and 20° C. than at 0° and 30° C. When defrosted in air, the medium-sized blocks discolored least at 20° C. When the large blocks were defrosted in running water at 7° C., for about 4 hours, the change in color was very slight; when they were defrosted in air at 2° C. for about 44 hours, discoloration was marked; being first defrosted in running water and then kept at 2° C. for an additional 40 hours caused intermediate degrees of discoloration.

From these results, the author concludes that the length of time required for frozen meat blocks to pass through the temperature range from -5° to -1.5° C. may account for the discoloration--the longer the time, the more the discoloration. [6 figures, 3 references]

3.2490 (1.37) RAINBOW TROUT (SALMO IRIDEUS) PRODUCED IN FINLAND. VII. CHANGES IN THE ORGANOLEPTIC QUALITY AND FATTY ACID COMPOSITION DURING FROZEN STORAGE

Varesmaa, E., J. J. Laine, and F. P. Niinivaara (Inst. of Meat Technology, Univ. Helsinki, Finland)
Maataloustieteellinen Aikakauskirja 41, No. 3, 160-164 (1969)
Food Science and Technology Abstracts 2, No. 2, 283, Item 2R62 (February 1970)

Rainbow trout weighing from 85 to 201 g. were gutted, frozen at -40° C., either glazed with water or vacuum sealed in polyethylene bags, and stored at either -18° or -32° C. The appearance, texture, color, odor, and flavor of the trout were evaluated at intervals of 1 day, 1 week, 1 month, and 3 months. The fish were inedible after 3 months' storage at either temperature. Packing method had no noticeable effect on organoleptic quality. Fish stored at -32° C. were judged slightly better than those stored at -18° C. No marked differences in the fatty acid composition of the lipids were attributable to storage time, storage temperature, or packing method. [14 references] LB

3.30 (3.3344)(3.34) BACTERIOLOGICAL AND SHELF-LIFE CHARACTERISTICS OF CANNED, PASTEURIZED CRAB CAKE MIX

Loaharanu, Paisan, and Anthony Lopez (Department of Food Science and Technology, Virginia Polytechnic Institute, Blacksburg, Virginia 24061)
Applied Microbiology 19, No. 5, 734-741 (May 1970)

Canned pasteurized crab cake mix is a relatively new product and little information is available on its shelf-life and spoilage characteristics. The commercial product contains crab meat, mayonnaise, bread crumbs, eggs, mustard, pepper, spice mix, and dry onion flakes. The mix is packed at atmospheric pressure in 307 x 409 C enameled cans (454 g. capacity) and the sealed cans are heated in a water bath at 85° to 87° C. for 110 min., then immediately cooled. The product, in cans, is stored at 0° to 5° C. The specific objectives of this study were: (1) to determine the shelf-life of canned, pasteurized crab cake mix at various temperatures by examining the bacteriological spoilage pattern through bacterial counts and characterization of the bacteria prevalent in the product and (2) to evaluate some of the existing objective tests as indices of quality and of degree of spoilage of the product.

Large numbers of mesophilic and psychrophilic bacteria survived the pasteurization process. Bacillus and Micrococcus predominated when the product was stored at 30° and 18° C. Alcaligenes predominated when the cans were stored at 2° C. The canned pasteurized product was free from Escherichia coli. Bacterial counts, volatile reducing substances values, and organoleptic test values correlated closely for the product stored at 30° C. The shelf-life of the product is 6 months at 2° C., 4 days at 18° C., and 27 hours at 30° C.
[5 figures, 5 tables, 27 references] FTP

3.231 (2.3) FROZEN FOOD HANDLING

United States Patent 3,485,125
Chase, R. M.; The Gorton Corporation (pat.)
Food Technology 24, No. 6, 68 (May 1970)

The apparatus cuts blocks of frozen foods such as fish. FTP

3.2344 FROZEN PRODUCT HANDLING

U.S. Patent 3,489,103
Hirahara, K., R. J. Betschart; FMC Corp. (pat.)
Food Technology 24, No. 6, 70 (June 1970)

This is a method for removing molded (but stickless) frozen food products from a molding conveyor. FTP

3.2344 FREEZING PROCESS

British Patent 1,174,188
F.M.C. Corp. (pat.)
Food Technology 24, No. 6, 70 (June 1970)

The foodstuffs are frozen in a mold that contains sections divided by strips. The individual blocks are separated after partial thawing. FTP

3.2344 FREEZING APPARATUS

Canadian Patent 826,135
Cloudy, W. R.; Lewis Refrigeration Corp. (pat.)
Food Technology 24, No. 4, 150 (April 1970)

This food freezing apparatus has a base plate bearing sharp tines that are used for penetrating into a food product and to rapidly extract the heat from the interior of the food. The base plate also supports a cluster of projections that dissipate the heat from the tines. FTP

3.4 TECHNIQUES IN SMOKING GOLDEYE (HIODON ALOSOIDES)

Lantz, A. W., and D. G. Iredale (Fisheries Res. Bd. of Canada, Freshwater Inst., Winnipeg, Manitoba)
Canadian Institute of Food Technology 2, No. 4, 157-159 (1969)
Food Science and Technology Abstracts 2, No. 4, 579, 4R147 (April 1970)

The authors describe work carried out to standardize the smoking of goldeye. They found that smoking temperature affected texture appreciably--temperatures between 150° and 180° F. gave a tough, mealy product. Temperatures between 90° and 120° F. gave a product of better color and more delicate flavor. Cooking methods for the product were also investigated. The most satisfactory was baking the fish in a sealed, foil wrap. [4 references]

3.2495

before and after the addition of ATP and $MgCl_2$ were proportional. The viscosity numbers with and without ATP were independent of the protein concentration. With the viscosity numbers as a constant, independent of concentration, the authors recognized that the characterization of actomyosin and myosin by means of the ATP-sensitivity test could be applied to carp muscle proteins. Thus the formula advanced by Portzehl and Weber in 1952 was considered applicable--

$$\frac{Z\eta r \quad Z\eta r,\ ATP}{Z\eta r,\ ATP} \times 100$$

where $Z\eta r$ is the viscosity number before the addition of ATP and $Z\eta r,\ ATP$ is the viscosity number after the addition of ATP. [4 figures, 8 references]

3.332 PREPARING CANNED MAINE SARDINES FROM FROZEN HERRING
(3.2341)(2.15)
(1.22)

Lane, J. Perry, and Clarence J. Carlson (Technological Laboratory, U.S. Bureau of Commercial Fisheries, Gloucester, Massachusetts)
Quick Frozen Foods 32, No. 11, 31-32 (June 1970)

This is part 1 of a two-part study--the second part will be published in the July (no. 12) issue of the journal. The purpose of the study was (1) to determine the feasibility of freezing Atlantic herring for later canning as sardines and (2) to explore the use of refrigerated sea water for preserving herring aboard the carrier boats.

The researchers found that good quality canned sardines could be prepared from Atlantic herring that had been frozen and stored for periods of up to 6 months. However, only herring that did not contain feed could be used. When frozen "feedy" herring were used, the belly portion of the fish would burst when the fish were thawed and precooked.

They found, also, that freshly caught herring could be successfully held overnight in refrigerated (33°-34° F.) sea water. Such fish could be passed through automatic fish orienting and cutting machines. Furthermore, good quality canned sardines could be prepared from Atlantic herring preserved overnight in refrigerated sea water. [1 illustration, 1 table]

4.11 GAS CHROMATOGRAPHIC ANALYSIS OF FATTY ACID AMIDES
(4.14) IN VISCERAL LIPID OF FIN WHALE

Nakamura, Takashi, and Masamichi Toyomizu (Lab. Fish. Tec., Kyushu Univ., Fukuoka, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 2, 192-194 (February 1970) (In Japanese; figures, table, and summary in English)

In a previous paper, the authors demonstrated the presence of fatty acid amides ($RCONH_2$) in the visceral lipid of fin whale. Here they discuss the application of gas chromatography to the analysis of $RCONH_2$.

Although $RCONH_2$ directly injected on an SE-30 column was easily detected, the unsaturated amides were not distinguishable from the saturated ones. On a diethylene glycol succinate polyester column, $RCONH_2$ prepared from visceral lipid of fin whale separated into many symmetrical peaks. The saturated fatty acid amides were identified from the relation between their carbon number and the logarithm of their retention time. $RCONH_2$ composition determined by the direct injection method was compared with that determined after conversion of the $RCONH_2$ to fatty acid methyl esters; they were almost identical. From this comparison, the authors conclude that the gas chromatographic method of analyzing $RCONH_2$ is not only convenient but accurate. [3 figures, 1 table, 5 references]

3.60 RECOVERY OF COMPRESSED DEHYDRATED FOODS

MacKenzie, A. P., and B. J. Luyet (American Foundation for Biological Research, Madison, Wisconsin)
U.S. Government Research and Development Reports 70, No. 11, 46-47 (June 10, 1970) Available from the Clearinghouse for Federal Scientific and Technical Information, U.S. Department of Commerce, Springfield, Virginia 22151. Publication No. AD-703 901. 142 pp. (July 1969) Price $3.00.

Seven foods were frozen at various rates, freeze-dried in different ways and adjusted to different moisture contents by exposure to atmospheres of controlled R.H. The resultant materials were compressed, dried, and tested for their capacities to recover initial form and quality on rehydration. Compression in vacuum was successfully demonstrated. Similarly, freeze-drying, adjustment of the water content, compression, and final drying were realized in a single apparatus. These methods were each shown to possess special advantages. Additional experiments were conducted on the compression of solvent-extracted foods. Freeze-dried, compressed, and restored foods were also examined by light and electron microscopic techniques. From these additional studies some indications were obtained of the mechanisms and factors contributing to restoration. (Author)

4.19 FATTY ACID COMPOSITION OF LIPIDS OF STURGEON CRUDE ROE

Ost'yakova, E. B., and A. P. Chernogortzev (Fish Industry Institute, Astrakhan, U.S.S.R.)
Piszczevaja Tiechnołogia No. 1, 63-65 (1969)

The lipid composition of the crude roe of beluga (Huso puso), sturgeon (Acipenser güldenstädti), and sterlet (Acipenser sterlatus) was investigated. The lipids were extracted with a mixture of chloroform and methanol (3:1 v/v); at the last moment of blending, 0.8 volume of water was added. Lipids were separated on silica gel by thin-layer chromatography (hexene:diethyl ether:acetic acid = 70:30:2 v/v) and methylated with methanol. Methyl esters of lipids were analyzed by gas-liquid chromatography.

The lipids constituted from 15 to 22 percent of crude roe weight, and contained from 75 to 79 percent of free fatty acids. Palmitic and oleic acids composed from 90 to 95 percent of the free fatty acids.

The lipids of crude roe stored at 2° to 4° C. for 3 to 4 months showed a considerable change in composition. Palmitic and oleic acids in the crude roe of sturgeon decreased to the level of 21 to 24 percent. The content of myristic acid dropped by a factor of two, and polyunsaturated fatty acids also decreased substantially. A new component appeared, an isomer of palmitic acid, in the quantity of 28 percent. These changes were less pronounced in the crude roe of beluga than in crude roe of sturgeon and sterlet. [3 tables, 4 references]

[over]

3.9 FISH FERMENTATION

Roels, O. A., and A. Chu (Marine Biology Division of Lamont-Doherty Geological Observatory of Columbia Univ., Palisades, New York 10964)
Abstracts of Papers. American Chemical Society 158: MICR 43 (1969)
Food Science and Technology Abstracts 2, No. 2, 284, Item 2R67 (February 1970)

Fatty fish that are not eaten direct by the human consumer can be fermented to produce acceptable human food with high protein value. After screening 387 microorganisms for their lipolytic activity, the authors selected seven yeasts and one mold for use in fermenting fish. The selected organisms produced either extracellular lipases or products of acceptable flavor, or both. Fermenting mature menhaden with Candida lipolytica reduced the fat content by 16 percent and increased the protein content by 13 percent within 72 hours. Geotrichum candidum reduced the lipids of young menhaden by 33 percent and increased protein by 20 percent in the same time span.

With triolein as the lipid substrate, optimal conditions for lipase production by G. candidum were studied in various media. Media containing inorganic N yielded four times as much lipase as the media containing organic N yielded. Thirty-five percent of the fatty acid moiety of labeled triglyceride from the medium and 43 percent of the labeled glycerol were incorporated in the microbial cells. LB

4.19

Fatty acid	Percent of lipids			
	Beluga*	Sturgeon*	Sturgeon**	Sterlet*
C_{14-0}	0.94	0.84	0.58	1.08
C_{14-1}	0.65	0.81	0.33	1.84
$C_{16-0,\ iso}$	-	-	0.23	-
C_{16-0}	38.02	30.38	28.42	33.30
$C_{16-1(7)}$	1.07	3.64	2.49	-
$C_{16-2(9,12)}$	-	-	1.27	1.50
$C_{18-1(9)}$	36.42	36.50	37.20	32.20
C_{18-2}	1.13	1.83	2.63	1.26
$C_{18-3(9,12,15)}$	-	2.21	2.54	2.65
$C_{20-2(8,11)}$	-	1.64	2.05	1.01
$C_{20-3(7,11,14)}$	-	1.96	2.19	3.44

* Caught in May.
** Caught in August.

4.14 UTILIZATION OF SPERM OIL. VI. CONCENTRATION OF OLEYL OLEATE FROM SPERM BODY OIL (4.80)

Abe, Yoshiro, Hajime Seino, and Masanori Kimura (Fac. Eng., Keio Univ., Koganei, Japan)
Chemical Abstracts 72, No. 8, 33518q (February 23, 1970)

3.9 MEAT-LIKE FLAVOR

U.S. Patent 3,480,477
Hack, A. W., and W. Kontigsdorf; Corn Products Co. (pat.)
Food Technology 24, No. 4, 148 (April 1970)

Meatlike flavoring products are prepared by combining cysteine-free amino-acid materials, a reducing sugar, and a sulfonic acid component. FTP

3.335 NEW PRODUCTS FROM BRITISH-CAUGHT FISH

(3.235)(6.54)
(2.8)
Anonymous
Fishing News No. 2971, 6 (May 22, 1970)

Torry Research Station (135, Abbey Road, Aberdeen, AB9 8DG, Scotland) has recently issued the following Advisory Notes:

No. 41 - Canned Fish, by R. McLay. Dr. McLay briefly describes a number of canned fish products that can be made from chilled or frozen raw fatty fish or white fish. Most of these products are not now being produced commercially in the United Kingdom. The Note gives some recipes that have been tried and found acceptable in Britain and shows how the use of modern canning techniques could considerably increase the variety that an enterprising processor might put on the market. The aim of the Note is to encourage a more adventurous approach to making and marketing canned fish. An enormous number of fish species, sauces, and combinations of the two are suggested as components of the new products.

No. 42 - Fish for Caterers and Fryers, by J. C. Early and R. Malton. The aim of this Note is to advise those who buy sea fish and serve it in schools, hospitals, factory canteens, restaurants, and fried fish shops how to select and handle the raw material. It also attempts to help caterers solve some of the problems they encounter on occasion when examining and handling fish.

No. 43 - Delicatessen Fish Products, by R. McLay. This Note continues the theme developed in Note No. 41--production of attractive food items from some of the less popular, underutilized fish species. It first outlines how the raw fish should be treated and then gives brief recipes for a variety of fish sausages, chips, crisps, fingers, and pies and a kipper pate.

No. 44 - Handling Fish Before Canning, by R. McLay. The focus of this Note is on fatty fish. It explains why chilling and freezing are necessary and contains some advice on thawing. [1 figure] LB

4.11 AUTOMATIC DETERMINATION OF DROPPING POINT

Harangozo, D.
Fette und Seifen 71, 826 (1969)
Food Manufacture 45, No. 3, 70 (March 1970)

The paper describes an automatic method for the determination of the dropping point of edible fats, waxes, paraffins, and cosmetic and pharmaceutical ointments. FTP

4.11 [SEPARATION AND STRUCTURAL ANALYSIS OF LIPID FRACTION EXTRACTED FROM FISH]

Ploquin, J., B. Souroudjieva, and L. Sparfel (Faculté de Médecine et de Pharmacie, Nantes, France)
Revue Française des Corps Gras 16, No. 12, 781-782 (1969)
Food Science and Technology Abstracts 2, No. 5, 723, 5R183 (May 1970)

Using an aerograph 705, the authors examined by gas chromatography the oil extracted by chlorinated solvents or by centrifuging mackerel hydrolyzates. They compared their data for 24 fatty acids with literature values. The concentration of C_{20} unsaturated fatty acids with from 1 to 5 double bonds was quite high. LB
[2 references]

4.5 ACCELERATION AND INHIBITION OF LIPID OXIDATION BY HEME COMPOUNDS

Kendrick, Jean and Betty M. Watts (Department of Food and Nutrition, Florida State University, Tallahassee, Fla. 32306)
Lipids 4, No. 6, 454-458 (November 1969)

The acceleration of and the inhibition of oxidation of unsaturated fatty acid were examined in model systems using an oxygen analyzer.

The linoleate-to-heme molar ratios for maximum catalysis were: 100 for hemin and catalase, 250 for metmyoglobin, 400 for cytochrome c, and 500 for methemoglobin. When heme concentrations were 2 to 4 times the optimum amount for maximum catalysis, no oxidation occurred. Heme was destroyed rapidly when the ratios of lipid to heme were catalyzing; but when the ratios were inhibitory, a stable red compound formed, possibly a lipid hydroperoxide derivative of the heme. The ratios of lipid to metmyoglobin for maximum catalytic activity varied with the pH. Linolenate was much less sensitive to heme catalysis than linoleate was. The colorless products of heme degradation showed a marked antioxidant effect.

The authors propose a possible mechanism for the antioxidant effect of hemes that has as its basis the formation of stable heme peroxide complexes or stable heme radicals, or both, during the early stages of oxidation. The prooxidant activity, the authors suggest, occurs only when the peroxide to heme ratio is so high that the oxidation of the hemes goes beyond the initial stages.
[3 figures, 2 tables, 13 references]

4.6 PRESERVATION OF LIPIDS WITH MALIC ACID

Berger, S. Edmund, Casimir V. Krolewski, and Leslie C. Wizemann (Specialty Chemicals Division, Allied Chemical Corporation, Buffalo, New York 14210)
Journal of the American Oil Chemists' Society 47, No. 5, 168-170 (May 1970)

Malic acid retards the oxidative deterioration of lipids; however, the published information reveals inconsistent performance of malic acid in stabilizing oils and fats. The present paper reports on the evaluation of the performance of malic acid in certain lipids of animal and vegetable origin under comparable conditions.

Oxidative stability of the lipids was determined at 99°-100° C. by an active oxidation method involving iodometric titration of the peroxides. The performance of citric acid was used as a standard of comparison. (Citric acid is widely used commercially as an antioxidant synergist and trace metal deactivator.) In most of the tests, the performance of the acids was determined in the presence and absence of added iron salts and the antioxidants butylated hydroxyanisole and butylated hydroxytoluene.

Malic acid was more effective in retarding oxidative deterioration than was citric acid when the acids were tested in vegetable oils, lard, and top white tallow. When the acids were used in fancy bleachable tallow and yellow grease, their relative performance varied.

Malic acid may have been generally more effective than citric acid because of its lower molecular weight, assuming the production of a 1:1 molecular metal-acid chelate. The lower molecular weight acid is expected to have greater metal binding efficiency. (over)

4.5 (0.35) PEROXIDATION OF MICROSOMAL MEMBRANE PROTEIN-LIPID COMPLEXES

Victoria, Edward J., and Albert A. Barber (Department of Zoology, University of California, Los Angeles, Calif. 90024)
Lipids 4, No. 6, 582-588 (November 1969)

The peroxidation of lipids in tissue homogenates proceeds enzymatically or nonenzymatically. The peroxidation reaction in pure lipids differs in several ways from that in tissue homogenates and these differences appear to be due to the association of the protein with the lipid in the homogenates. Certain membrane proteins (termed structural protein) isolated from beef heart mitochondria and other membrane sources, bind a wide variety of substances, including micellar lipid. In the present study, the structural protein-lipid micelle complex was used as a model system to examine the differences in lipid peroxidation between pure lipids and tissue homogenates. The structural protein and lipids were isolated from the rat liver microsomal fraction. The kinectic behavior, response to divalent cations, and iron-ascorbate catalysis were examined in pure lipid micelles in structural protein-lipid micelle complexes, and in microsomal fractions. Nonenzymatic lipid peroxidation was measured by the thiobarbituric acid (TBA) test.

The kinetics, response to divalent cations, and iron-ascorbate catalysis of lipid peroxidation were similar in the microsomal fraction and the structural protein-lipid complex, but different in the lipid micelles. The structural protein (over)

4.81 (4.82) FERMENTATION OF FISH LIPIDS

Li, C. F., D. Stuiber, T. Richardson, and C. H. Amundson (Department of Food Science, University of Wisconsin, Madison)
Food Product Development 4, No. 4, 28, 30, 32, 102-103 (June-July 1970)

New uses for the lipids of fish would aid in the economic utilization of many fatty fish species. A potential source of fish lipids is the production of fish protein concentrate (FPC) from fatty fish. In the FPC process, the lipids are recovered from the solvent used in the extraction. The purpose of this work was to study the fermentation of fish lipid in situ and of fish oil by selected lipolytic microorganisms. Chub (Leucichthys noyi), a fatty fish, and oil from the alewife (Alosa pseudoharengus) were used. The chubs and the alewives were from Lake Michigan. The test microorganisms were Candida lipolytica Y-1094 and Y-1095 and Geotrichum candidum Y-552. The cultures were obtained from the Northern Regional Research Laboratory of the U.S. Department of Agriculture, Peoria, Illinois. Two methods were used: (1) the fermentation mixture was placed in a flask and the sample was continuously agitated on a reciprocating shaker and (2) the fermentation mixture was placed in a glass fermentor (Stuiber, 1969) and the sample was continuously agitated.

In the shake-flask cultures, the three organisms used about 30 percent of the lipid in the fish. Addition of lipase to the mixture did not significantly alter the utilization of the lipid by the microorganisms. When the glass fermentor was used, the three microorganisms used up to 55 percent of the lipid in the fish (over)

4.60 ANTIOXIDANT PROPERTIES OF CHILI PEPPER

Stasch, Ann R., and Mae Martha Johnson (Home Economics Department, New Mexico State University, La Cruces, New Mexico)
Journal of the American Dietetic Association 56, No. 5, 409-412 (May 1970)

The purpose of this study was to determine whether chili pepper cooked with chicken, pork, or beef muscle demonstrated any antioxidant activity when the cooked meats were subsequently stored at -10° C. Nine kinds of chili pepper, representing hot, medium, and mild degrees of pungency, each at three stages of maturity, were tested with each of the three meats.

Mature green chili pepper (hot, medium, or mild) was most effective as an antioxidant for pork and chicken. A hot water extract of green chili pepper was most effective on frozen beef. The authors recommend that further studies on the interaction of foods in mixtures should be undertaken in view of the current trend toward centralized processing and longer storage before consumption.
[2 tables, 16 references] FTP

Malic acid was also tested against phosphoric acid. The performance of malic acid was equal to or better than that of phosphoric acid. The phosphoric acid caused the oils to become dark at the test temperature (90°-100° C.).
The authors conclude that malic acid is potentially a valuable stabilizer for lipids. However, because commercial processing conditions vary, the performance of malic acid and citric acid may differ from that in laboratory scale tests.
[2 tables, 16 references]

4.6

4.5 SODIUM CHLORIDE EFFECT ON AUTOXIDATION OF THE LARD COMPONENT OF A GEL

Ellis, R., A. M. Gaddis, G. T. Currie, and F. E. Thornton (USDA, Eastern Utilization R&D Div., ARS, Meat Laboratory, Beltsville, Maryland 20705)
Journal of Food Science 35, No. 1, 52-56 (January-February 1970)

Previous workers have shown that NaCl, acting directly or independently and (or) by sensitizing certain catalysts, seems to change the autoxidation characteristics of triglycerides in meats. The purpose of the present study was to examine the factors involved in the prooxidant and antioxidant activities of sodium chloride, other inorganic salts, heme compounds, meat fractions, and other additives. Stable gels composed of lard, sodium carboxymethoxy cellulose, and water (Bishov et al., 1960) were used. Determinations for peroxide value and for monocarbonyls were made to evaluate the autoxidation processes. The solid translucent gels, containing the additives, were stored frozen, freeze dried, or without other physical change. The hydrated gels were well aerated during preparation and were allowed to oxidize in the dark at 20° C.

A spongelike structure was produced when the gel was freeze dried. The material oxidized rapidly after first going through an induction period.

Gels stored in the freezer oxidized at a rate about equal to that of meat stored in a freezer.

Sodium chloride showed a direct prooxidant effect on the lard of the gels stored in the freezer and of the freeze-dried gels. Hydrated gels containing sodium chloride stored at 20° C. showed an inhibiting oxidation pattern similar to the influence of NaCl in decreasing the pH value of gels.

EDTA (ethylenediaminetetraacetate) showed a powerful antioxidant effect. NaCl accelerated heme catalysis regardless of the presence of an antioxidant or a chelating agent. [4 figures, 3 tables, 18 references] FTP

4.80 SURFACE ACTIVE LIPIDS IN FOODS
(4.12)(9.6)

S.C.I. Monograph No. 32, Society of Chemical Industry, 14 Belgrave Square, London S.W.1 (1968), 173 pp. Price about $5.00.
Reviewed by Norman E. Bednarcyk
Food Technology 24, No. 5, 42 (May 1970)

This book contains the papers and discussions presented at a symposium of the Food Group and the Fats and Oils Group of the S.C.I. (Society of Chemical Industry) held in March 1968. The papers deal with the theoretical and application aspects of surface active lipids in foods. The various papers consider molecular aggregation in phospholipid dispersions; structures of emulsifier-water phases; effects of emulsifiers on the crystallization of triglycerides; properties of membrane lipids; plant lipids; mechanism of the promotion of emulsification; and surface active lipids in milk products, egg yolk, chocolate, and baked goods. FTP

The three microorganisms were also tried with alewife oil in the glass fermentor. Under optimum conditions, approximately 80 g. of yeast was derived from 100 g. of fish oil (yielding approximately 30 g. of crude microbial protein per 100 g. of fish oil). A free-flowing powder, containing over 40 percent crude protein, was obtained by extracting the microorganisms with petroleum ether.
The G. candidum preferentially utilized the long-chain polyunsaturated fatty acids. The methionine, tyrosine, and phenylalanine content of the microorganisms was low. [10 tables, 14 references]

4.81

4.21 [RATE OF STEROL ESTER AUTOXIDATION IN VARIOUS OILS]

Sawicki, J., and H. Niewiadomski (Katedra Chemii i Technologii Tluszczow, Politechnika, Gdansk, Poland)
Roczniki Technologii i Chemii Zywnosci 16, 115-121 (1969)
Food Science and Technology Abstracts 2, No. 4, 577, 4R128 (April 1970)

O_2 was bubbled at elevated [sic] temperature through oils extracted from rapeseed, soya beans, sunflower seed, and redfish (Sebastes marinus). At intervals, the autoxidation of the free and bound sterols was assessed by column chromatography on alumina followed by thin-layer chromatography on silica gel. Peroxide values and the nonoxidized sterol ester contents were tabulated.

Autoxidation affected the acyl parts of the sterol esters. The rate of autoxidation of the oils decreased in the following order: redfish, sunflower seed, soya bean, and rapeseed. [5 references] LB

The authors conclude that lipid peroxidation in microsomal suspensions appears to be determined, in part, by the hydrophobic nature of the protein-lipid association found in the membranes. [6 figures, 5 tables, 27 references]

4.5

4.60 ANTI-OXIDANTS

British Patent 1,170,892
Kyowa Hakko Kogyo K.K. (pat.)
Food Technology 24, No. 4, 148 (April 1970)

Alkyl thioamines, such as 3-methylthiopropylamine, are used as antioxidants in foodstuffs.

4.81 ENRICHMENT COMPOSITIONS

Canadian Patent 830,440
Toki, K., and H. Nakatani; Sumitomo Chemical Co., Ltd. (pat.)
Food Technology 24, No. 5, 68 (May 1970)

Certain foodstuffs are enriched by the addition of amides of unsaturated fatty acids containing 15 to 24 carbon atoms and 1 to 8 double bonds.

6.190 NOTES ON THE FEEDSTUFFS ANALYSIS TABLE
(6.82)

Anonymous
Feedstuffs 42, No. 22, 18-19 (May 30, 1970)

The Feedstuffs Analysis Table prepared and copyrighted by Charles H. Hubbell, Feed Consultant, Des Plaines, Illinois, is published annually to provide a convenient summary of the latest information on the composition of commonly used feed ingredients. Values in the table represent what a person concerned with feed formulations would reasonably expect to find in a given feedstuff. Among the ingredients listed are fish meal (anchovie, herring, menhaden, red fish, sardine, tuna, and white), fish solubles (condensed and 50 percent solids), shrimp meal, and oyster shell.

Reprints of the 1970 Feedstuffs Analysis Table and the notes that accompany it may be obtained from Feedstuffs, Reader Service Department, P.O. Box 67, Minneapolis, Minnesota 55440. Prices are as follows: 1 copy, 50¢ each; from 2 to 9 copies, 30¢ each; 10 or more copies, 25¢ each.

6.10 POULTRY: FEEDS AND NUTRITION
(9.6)

Schaible, Philip J. (Michigan State University, East Lansing)
AVI Publishing Co., Box 670, Westport, Connecticut 06880 (1970), 648 pp. $22.50 domestic, $23.50 foreign.

In 38 chapters, the author presents a comprehensive treatment of the fundamentals of nutrition and their application to the poultry and feed industries. He systematically covers every nutritional aspect from receipt of raw feed ingredients to formulation and blending of finished feeds. The data are based on the nutritive requirements of poultry and the interrelation between those requirements and the nutrients supplied. Quality control of feeds and formulation of feeds by use of computer are specially emphasized. For the first time in a U.S. nutrition book, the international aspects of feed supplies and the composition of these feeds are discussed.

The book has an index and seven appendices (a glossary, feed and processing definitions, feed terms, U.S. Food and Drug Administration definitions, terms for structure and composition of foods, poultry terms, and a list of poultry breeders).

6.34 LOCALIZATION OF A CELL WALL POLYSACCHARIDE IN A BROWN ALGA WITH LABELED ANTIBODY

Vreeland, Valerie (Department of Biological Sciences, Stanford University, Stanford, California 94305)
Journal of Histochemistry and Cytochemistry 18, No. 5, 371-373 (May 1970)

Extracellular carbohydrates are produced in quantity and variety in higher brown algae. Several approaches have been taken toward determining the location in these algae of such extractible substances as cellulose, alginic acid, fucoidan, and glucuronoxylofucan sulfates. In this report, the author discusses the modification and use of fluorescent-labeled antibody and peroxidase-labeled antibody methods for localizing an alginate fraction in the cell walls and matrix of Fucus distichus.

The results to date indicate that alginate is present throughout the medullary matrix in younger regions of the thallus; in older stipe tissue with the epidermis worn away, it is not detectible with the method described. The pattern of distribution of the alginate in walls of oogonial mother cells suggests that a layer of the alginate is laid down early in the development of the cell; as the cell enlarges, this is followed by apposition of a layer that is essentially free of alginate.

The use of the fluorescent antibody method for intracellular localization of antigen is limited by the intensity of specific fluorescence; localization with peroxidase-labeled antibody was impossible because of nonspecific staining of phenolic compounds. [4 figures]

6.32 [A NEW NUTRITIVE ALGA]

Clement, G., H. Durand-Chastel, and V. Henny (Institut Français du Pétrole, Rueil Malmaison, France)
Voeding 30, No. 12, 772-781 (1969)
Food Science and Technology Abstracts 2, No. 3, 346, Item 3G124 (March 1970)

The production costs and economic possibilities of and the developmental work already done on the spiruline alga Cyanophycae are discussed. The optimal conditions for growth were found to be a temperature of 30° to 35° C., light of more than 25,000 lux, a pH of from 8.5 to 11, the availability of sodium ions, and a constant concentration of bicarbonate ions supplemented with carbon dioxide. The algae were found to contain 10 percent moisture, 4 percent cellulose, from 4 to 8 percent minerals, and 10 or 11 percent nitrogen. From 63 to 68 percent of the total nitrogen represented proteins that contained all the essential amino acids. LB

6.30 MIKRO ALGEN IN DER MENSCHLICHEN ERNÄHRUNG [MICRO ALGAE IN HUMAN NUTRITION]

Koltranyi, E. (Kohlenstoffbiologischen Forschungsstation, Dortmund, W. Germany)
Voeding 30, No. 11, 719-726 (1969)
Food Science and Technology Abstracts 2, No. 3, 346, Item 3G123 (March 1970)

The cultivation and composition of Scenedesmus obliquus are described, and results of using it in human and animal nutrition are given. The protein content of the alga was more than 50 percent, and the biological value of the proteins, though lower than that of egg or milk, was higher than that of wheat or corn. Alga-containing products were organoleptically acceptable. Cost calculations showed that a reduction in the price of protein is possible through use of algal products. [5 references] LB

6.37 [ARTIFICIAL LAVER]

Suzaki, K., and A. Fukai (pat.)
Japanese Patent 27,703/69 (1969)
Food Science and Technology Abstracts 2, No. 5, 625, 5G222 (May 1970)

Artificial laver is made from dried, pelletized, chlorella compositions. LB

6.37 NEW FEED PREPARATION CONTAINING SPIRULINE TYPE ALGAE

Clement, Genevieve, Colette Meyer, and Michel Rebeller (Institut Francais du Petrole, des Carburants et Lubrifiants)
French Patent 1,557,635
Chemical Abstracts 72, No. 7, 30467m (February 16, 1970)

6.37 DRIED LAVER

Japanese Patent 30578/69
Kao Soap Co. Ltd. (pat.)
Food Technology 24, No. 6, 70 (June 1970)

This method for producing dried laver includes a washing step with a solution mixture containing polyoxyethylenedodecylphenol ether. FTP

6.37 SEASONED LAVER COMPOSITIONS

Japanese Patent 30579/69
Asahi Chem. Ind. Co. (pat.)
Food Technology 24, No. 6, 70 (June 1970)

The laver compositions are coated with hardened oils or fats, or glycol fatty acid esters. FTP

6.133 EDIBLE OILS AND FATS 1969

Bednarcyk, N. E.
Food Processing Review No. 5, Noyes Development Corp., Park Ridge, New Jersey 07656 (1969), 404 pp. Price $35.00.
Reviewed by Manfred Kroger
Food Technology 24, No. 5, 76 (May 1970)

This book describes 225 processes covered by the United States patents that have been issued since 1960. The processes deal with the edible oils and fats industries. FTP

5.129 VITAMIN A CONTENT OF FOODS INCLUDED IN THE FOOD COMPOSITION TABLE FOR USE IN LATIN AMERICA

Flores, M., M. T. Menchu, M. Y. Lara, and G. Arroyave (Inst. de Nutrición de Centro America y Panama (INCAP), Guatemala City, Guatemala)
Archivos Latinoamericanos de Nutrición 19, No. 3, 311-341 (1969)
Food Science and Technology Abstracts 2, No. 4, 456, 4A144 (April 1970)

Values in µg./100 g. edible product are tabulated for the concentration of retinol, β-carotene, and other carotenoids in fish, crustacea, molluscks, oils and fats, and other foods consumed in Latin America. An appendix contains instructions on how to use the tables. [3 references] LB

6.130 DEFATTED FISH PROTEIN

Canadian Patent 830,935
Somlai, I.; Astra Nutrition AB. (pat.)
Food Technology 24, No. 5, 62 (May 1970)

Fish meal is defatted by a combination of conventional solvent extraction, leaching, and centrifugation processes. FTP

6.13 [FRACTIONING FISH]

Ehrensuard, C. H. G., B. V. Lofquist, and L. B. Sjoberg (Astra Nutrition A.B.)
Swedish Patent Appl. 316,675 (1969)
Food Science and Technology Abstracts 2, No. 5, 719, 5R154 (May 1970)

The process for fractioning fish includes the following steps: subdividing the fish; adding water and 3.5-17.5 g. Ca ions/kg. (wet weight) fresh fish (preferably 5.7-10.0 g. Ca ions/kg. fresh-water fish and 10.0-14.3 g. Ca ions/kg. salt-water fish) while maintaining the pH at <12; homogenizing the mixture for from 2 to 10 min. at <40° C. (preferably at between 30° and 40° C.); recovering the solids, fat, and protein from the homogenate to give a first phase containing solids, a second phase containing protein, and a third phase containing fats; and precipitating the protein from the other phases. The process makes possible the recovery from fish of proteins, fats, nucleotides, bones, and salts that can be used as nutrients. LB

6.54 (0.7) A FEEDING TRIAL OF FISH PROTEIN CONCENTRATE WITH PRESCHOOL CHILDREN

Brinkman, G. L. (College of Human Development, Pennsylvania State, University Park 16802), and B. Sharadambal and V. Madhave (Institute of Nutrition Sciences, Columbia University, 511 W. 166th Street, New York, N.Y. 10032)
American Journal of Clinical Nutrition 23, No. 4, 395-399 (April 1970)

Children from 2 to 5 years of age are known to be in a high-risk age group for malnutrition. The object of this study was to test the acceptability and tolerance of VioBin fish protein concentrate (FPC) when offered to relatively healthy preschool children in this age group. A secondary objective was to observe any changes that might take place in the children's weight and hemoglobin values.

The authors fed 37 children in a Trinidad orphanage an average of 30 g. of FPC every day for 9 weeks (except during the 4- to 7-day period when all but eight had measles). This amount constituted about half the daily protein and all the animal protein in the children's diets. After the first 3 days, the children accepted the diets well, tolerated them well, and consumed them totally. The performance of the FPC-fed group was similar to that of a milk-fed control group. Concentrations of hemoglobin decreased in both groups, possibly as a result of iron deficiency. [1 table, 8 references]

0.38 (0.36)(1.86) PRODUCTION OF 11-KETOTESTOSTERONE AND OTHER STEROIDS BY THE SLICED OVARIES OF CRAB, PORTUNUS TRITUBERCULATUS

Teshima, Shin-ichi, and Akio Kanazawa (Faculty of Fisheries, Kagoshima University, Shimoarata-cho, Kagoshima City, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 3, 246-249 (March 1970)

Many workers over the past 40 years have suggested the presence of steroid hormonelike materials in marine invertebrates. These substances have been chemically identified in the eggs of lobster and the ovaries of starfish and sea urchin. Also, the gonads of sea urchin, oyster, lobster, scallop, and blue crab have been shown to contain the enzyme systems for steroid hormone biosynthesis. The present study demonstrated that crab (Portunus trituberculatus) has the enzyme systems needed for synthesis of 11-ketotestosterone, 11 β-hydroxy-androst-4-ene-3,17-dione, testosterone, and 17 α-hydroxy-progesterone.
[3 tables, 28 references]

6.55 (6.82) EFFECTIVENESS OF EXTRA-DIETARY CALCIUM SUPPLEMENTS IN IMPROVING EGG SHELL QUALITY

Moran, Edwin T., Jr. (Department of Poultry Science, University of Guelph, Guelph, Ontario, Canada)
Feedstuffs 42, No. 25, 46, 48-49 (June 20, 1970)

Following a discussion of the shell-forming process during elaboration of the egg, including the hen's system of meeting her calcium demands and the quality of the shell as a function of the efficiency with which she utilizes dietary calcium, the author describes experiments in which oyster shell, dicalcium phosphate, and bone meal were used as extra-dietary supplements in the rations of laying hens. None of the supplements, when fed in conjunction with a normal 15 percent protein, 3 percent calcium mash, had any effect on live performance or shell quality. (Shell quality was judged on the basis of weight, thickness, and nondestructive deformation.) Lowering the calcium in the ration to 1 percent led to an increased intake of extra-dietary supplements. Even so, the resulting live performance and egg-shell quality were indistinguishable from those resulting from the control diet. Although calcium from oyster shell or from a phosphorus-containing pellet is readily available to the hen, the fact that the pellet never gave a shell quality better than that given by the control diet or by the oyster-shell supplement precludes the use of phosphorus as a practical means of improving extra-dietary calcium utilization.

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7.51 STUDIES ON GEL FILTRATION OF FISH MUSCLE PROTEIN. III. ELUTION PATTERNS OF PROTEIN EXTRACTS FROM FISH AND RABBIT MUSCLE BY GEL FILTRATION USING SEPHAROSE 2B

Umemoto, Shigeru, and Koichi Kanna (Tokai Reg. Fish. Res. Lab., Kachidoki, Chuo-ku, Tokyo, 104, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 4, 414-420 (April 1970) (In Japanese; figures, table, and summary in English)

The extractability of muscle protein can be used as an index of the protein denaturation or insolubilization that may occur in frozen fish muscle. In addition, the composition of the extracted protein may be a useful index for tracing the course and progress of protein denaturation. In 1969, the authors reported that fish muscle proteins were eluted separately in actomyosin (or its aggregates, or both), myosin, and myogen by gel filtration in which agarose gels with a very high porosity were used. To learn the composition of the extractable proteins contained in fresh muscle, they analyzed, by gel filtration and ultracentrifugation, the protein extracts of fresh muscle.

The protein extracts were prepared, with KCl-phosphate buffer solution (I = 0.5, pH 7.2) as extractant, from the muscle of sea bass (Lateolabrax japonicus Cuvier), yellowtail (Seriola quinqueradiata Temminck and Schlegel), and rabbit. For fresh fish muscle, two peaks of actomyosin and myogen appeared in the elution patterns given by gel filtration of extracts obtained by both a brief extraction procedure (about 1 hour) and a prolonged extraction procedure (1 day). For fresh

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7.49 (9.19) 2,3-DIAMINONAPHTHALENE AS A SPECTROPHOTOMETRIC AND FLUOROMETRIC REAGENT FOR THE DETERMINATION OF NITRITE ION

Wiersma, James H. (College of Environmental Sciences, University of Wisconsin, Green Bay, Wis. 54305)
Analytical Letters 3, No. 3, 123-132 (March 1970)

Nitrite is one of the first ions to appear in aqueous environmental systems at the onset of reducing conditions. This paper reports on spectrophotometric and fluorometric procedures for the trace analysis of nitrite ion based upon 2,3-naphthotriazole formation with the reagent 2,3-diaminonaphthalene. The author discusses reaction conditions interferences, solvent extraction, and sensitivity of the procedures. [2 figures, 2 tables, 6 references] FTP

The more common calculations used in the analysis of food in one government laboratory are given with examples. Equations are set up so that data can be fed into them. The examples serve as checks for calculations and whether meaningful values have been obtained. Factors and significant figures extend the usefulness of the calculations. [Author's abstract]

7.0 CALCULATIONS USED IN FOOD ANALYSIS

Coleman, Charles H. (Defense Subsistence Testing Lab., Chicago, Illinois)
U.S. Government Research and Development Reports 70, No. 7, 40 (date not given)
Available from the Clearing House for Federal Scientific and Technical Information, 5285 Port Royal Road, Springfield, Virginia 22151. Order No. AD-703 325 (1968). Price $3.00.

6.54 FISH PROTEIN CONCENTRATE

Carsten, A. (Nenniger and Chênevert Inc., Montreal, Canada)
Food Manufacture 45, No. 4, 60, 62, 64, 66 (April 1970)

This article is a review of the production, utilization, and marketing of fish protein concentrate. FTP

Canned product containing edible oils, egg yolk, and natural gums and with or without meat or fish is processed in a rotary retort. FTP

6.54 SALAD DRESSINGS

Japanese Patent 27699/69
Nichiro Fisheries Co., Ltd. (pat.)
Food Technology 24, No. 5, 64 (May 1970)

Pastelike compositions for packing into tubes or for converting into fish balls are prepared from raw protein-containing fish materials mixed with anionic colloids. FTP

6.54 FISH PROTEIN PRODUCT

British Patent 1,171,982
Société de Produits Chimiques d'Aubrey; SA des Établissements Brissonneau et Lotz (pat.)
Food Technology 24, No. 5, 62 (May 1970)

Pastelike compositions for packing into tubes or for converting into fish balls are prepared from raw protein-containing fish materials mixed with anionic colloids.

When oyster shell was offered with the 3 percent calcium diet, rate of egg production, body weight, and the efficiency with which the feed was converted to egg were all reduced. The author attributes this reduction to the excessive amounts of calcium consumed by the hen as a result of increased feed intake during the egg-laying cycle. In 1968, Stroud suggested a simple technique that would permit the laying hen to meet her needs without incurring extensive transient inadequacies from over consumption: a part of the limestone in the mash (from 2.5 to 5.0 percent of the total diet) would be replaced by an equivalent amount of oyster shell. The hen would pick the oyster shell out of the feed as her needs dictated, balancing her own diet instead of eating the whole ration to satisfy a calcium hunger. The advantage of this technique is demonstrated by the consistently lower carcass fat of hens offered oyster shell free-choice.
[5 tables, 7 references]

6.55

6.54 (3.235) VERFAHREN UND ANORDNUNG ZUR HERSTELLUNG VON GEFORMTEN PRODUKTEN AUS HOMOGENISAT [PROCESS FOR MANUFACTURE OF FORMED PRODUCTS FROM HOMOGENATES]

Gutschow, W. (pat.)
East German (DDR) Patent 68,138 (1969)
Food Science and Technology Abstracts 2, No. 4, 576-577, 4R126 (April 1970)

Finely comminuted, minced fish is molded into a stiff, continuous cord. The product is then heated; cooled; either wet- or dry-coated, or both; portioned; and either fried or frozen, or both. The coating is evenly distributed over the fish cord by being dusted, sprinkled, or sprayed on. LB

7.81 EVALUATION OF MUSCLE HYPOXANTHINE AND VOLATILE BASES AS POTENTIAL QUALITY INDICES FOR INDUSTRIAL BOTTOMFISHES FROM THE GULF OF MEXICO

Guardia, Enrique J., and Gerhard J. Haas (Corporate Research Department, General Food Corporation, Tarrytown, New York 10591)
Fishery Industrial Research 5, No. 3, 117-120 (August 1969)

Croaker and spot are the two species of fishes found most commonly in catches of industrial bottomfishes in the Gulf of Mexico. Hypoxanthine increased linearly in both species during the first 2 weeks that these fishes were stored in ice. This test for hypoxanthine could thus indicate the quality of both croaker and spot and presumably that of the whole catch. Only after the fish had been stored 1 week in ice, however, did the total volatile bases increase. Consequently, this latter test could not be used as an index of freshness, although it might be used as an index of spoilage. [4 figures, 5 references] [Authors' abstract]

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rabbit muscle, peaks of myosin and myogen appeared in the elution pattern of extracts obtained by the brief extraction procedure and peaks of actomyosin and myogen appeared in those obtained by the prolonged extraction procedure. Results obtained by ultracentrifugation confirmed the results obtained by gel filtration. The elution patterns given by gel filtration also showed rough profiles of the protein composition of the extracts. These results indicate that changes in elution patterns may give some useful information about changes in the composition of the extractable muscle protein. [8 figures, 1 table, 11 references]

7.51

7.51 NITROGEN DETERMINATION FOR RAPID QUALITY CONTROL OF OILSEED MEALS

McCready, R. M., G. Fuller, and Mona Gauger (Western Regional Laboratory, U.S. Department of Agriculture, Albany, California 94710)
Journal of the American Oil Chemists' Society 47, No. 5, 171-172 (May 1970)

The traditional Kjeldahl method for determining nitrogen (protein) in oilseed meals is stisfactory but is too time consuming for commercial plants handling large quantities of meal. This paper reports on studies to develop a rapid method for analysis of protein by modifying existing procedures and using equipment available in quality control feed laboratories.

Two general methods were tried: (1) Udy's (1956) dye-binding method and (2) accelerated Kjeldahl digestion procedures. Safflower meal was the test oilseed meal.

Udy's method using Orange-G showed promise but was not satisfactory under the conditions of the test. The authors are engaged in further work on the method.

The best results were obtained with the accelerated Kjeldahl digestion procedures. The results obtained by the accelerated method agreed with those obtained by the standard Kjeldahl method. The recommended accelerated AOAC procedure is as follows: (1) weigh 1.0 g. of oilseed meal; (2) digest sample with 25 ml. of sulfuric acid, 0.7 g. of mercuric oxide, and 15 g. of potassium sulfate for 15 min.; (3) cool the digestion solution; (4) add 125 ml. ice water, 50 ml. sodium hyroxide, and 5 ml. sodium thiosulfate to the digestive solution; (5) dis-
(over)

7.520 AN IMPROVED SYSTEM FOR AUTOMATIC AMINO-ACID ANALYSIS

Jacobs, S. (National Institute for Medical Research, Mill Hill, London, N.W.7, England)
Analyst 95, No. 1129, 370-378 (April 1970)

The introduction describes the essential characteristics of an efficient ion-exchange resin required to separate individual amino acids from their complex mixtures. Important factors are the cross-linkage, or water regain value, the diameters of the resin beads, and the degree of sulfonation of the ion-exchange resin.

The author used a commercial automatic amino-acid analyzer to study the reaction between indanetrione hydrate and the eluted amino compounds passing through the reaction coil at various rates of flow. A specially designed reaction coil was used for the maximum development of the colored complexes formed by the individual amino acids, and the respective color factors and molar extinction coefficients were determined. The tests indicated the maximum rate of flow of the eluting buffer solution through the commercial reaction coil above which the normal color factors of the amino acids are not obtained. The critical maximum rate of flow cannot be exceeded if the commercial instrument is to be used for the quantitative determination of amino acids. [2 figures, 8 tables, 18 references]

7.593 A RAPID AND SIMPLE METHOD FOR SEPARATION AND QUANTITATION OF RIBONUCLEOSIDES

Van den Bos, R. C., G. J. Van Kamp, and R. J. Planta (Biochemisch Laboratorium, Vrije Universiteit, Amsterdam, The Netherlands)
Analytical Biochemistry 35, No. 1, 32-34 (May 1970)

In the course of studies on the structure of ribosomal ribonucleic acid (RNA), the authors had to find a rapid and simple method for quantitatively separating the ribonucleosides that are liberated as nucleosides by alkaline hydrolysis of RNA. Several methods, such as (1) paper chromatography, (2) ligand-exchange chromatography, and (3) gel filtration on molecular sieves (for example, Bio-Gel P-2 on Sephadex G-10). Each of these methods has certain limitations. In this paper, the authors report the useful adaptation of the gel filtration technique. The method is rapid and gives reproducible results for the determination of ribonucleosides. The technique is basically the one described by Carrara and Bernardi (1968), who also suggested that it might be applied to the separation of ribonucleosides.

A solution of the ribonucleosides in a volatile buffer (0.01 M ammonium bicarbonate, pH 10.6) is applied on a Bio-Gel P-2 column (40 x 2 cm.) and eluted with the same buffer at a flow rate of 20 ml./hr. Separations are at room temperature. The researchers obtained complete separation of four ribonucleosides (uridine, guanosine, cytidine, and adenosine) in a single run. Furthermore, sharper peaks were obtained by the separation on the polyacrylamide gel than other
(over)

7.593 HIGH SPEED SEPARATIONS OF NUCLEOTIDES AND NUCLEIC ACID BASES BY COLUMN CHROMATOGRAPHY USING CONTROLLED SURFACE POROSITY ION EXCHANGERS

Kirkland, J. J. (E. I. du Pont de Nemours and Company, Industrial and Biochemicals Department, Experimental Station, Wilmington, Delaware 19898)
Journal of Chromatographic Science 8, No. 2, 72-75 (February 1970)

Ion-exchange column chromatography is preferred for analyzing nucleic acids and related substances. Recently, gas-liquid chromatography (GLC) has been proposed for analyzing the components of nucleic acids. In the GLC methods, volatile derivatives must be prepared for analysis and the derivation scheme usually requires several reaction steps. Even though GLC separation is rapid, the analysis of nucleotides and nucleic acid bases by ion-exchange column chromatography has specific advantages--for example, the compounds may be analyzed directly after their formation from biological material by hydrolysis without having to prepare their volatile derivatives (as required in the GLC analysis). The authors show in this paper that rapid separations of nucleotides and nucleic acid bases can be carried out by column chromatography using new "Zipax" (trademark for controlled porosity anion and cation exchange packings).

As an example, mixtures of the four main ribonucleoside-5'-monophosphoric acids can be separated in about 6 min. with a strongly basic anion exchange column containing nonporous, spherical support particles uniformly coated with a thin, porous layer of sorbent. The high speed capability of the new ion exchangers, as compared with conventional ion-exchange resins, are primarily due to
(over)

7.591 A NEW FLUOROMETRIC ASSAY OF β-GLUCURONIDASE IN TISSUES AND SERUM

Wong, Kim Ping (Department of Biochemistry, Medical Faculty, University of Singapore, Singapore)
Analytical Biochemistry 35, No. 1, 35-45 (May 1970)

The enzyme β-glucuronidase (β-D-glucuronide glucuronohydrolase, EC 3.2.1.31) catalyzes the hydrolysis of β-glucuronides or β-D-glucopyranosiduronic acids. Abnormal activity of this enzyme in the serum has been associated with atherosclerosis, diabetes, and cancer. In the present study, harmol glucuronide was synthesized in vitro using uridine diphosphate glucuronic acid and guinea pig liver microsomes. It was separated by column chromatography on Sephadex G-25. The glucuronide was chromatographically pure and it was subject to hydrolysis by bovine liver, bacterial and molluscan β-glucuronidase. Harmol and glucuronic acids were found in the hydrolyzate. Boiled saccharate (above 0.001 M) completely inhibited the enzymic hydrolysis. The authors used the enzymically synthesized glucuronide as a substrate in the determination of β-glucuronidase in liver, kidney, spleen, heart, brain, and serum of certain experimental animals and in human serum. [5 figures, 3 tables, 45 references] FTP

7.593

researchers obtained using a Sephadex G-10 column. The column height required with Bio-Gel P-2 column is less than that required with a Sephadex G-10 column and, as a result, the separations require less time. Also, the volatile elution buffer can be removed by lyophilization--an advantage when the radioactivity of labeled nucleosides has to be measured. [1 figure, 8 references]

7.595 FLUORIMETRIC DETERMINATION OF BUTYLATED HYDROXY ANISOLE IN FOOD PRODUCTS AND PACKAGING MATERIAL

Hurtubise, R. J., and Howard W. Latz (Department of Chemistry, Ohio University, Athens, Ohio)
Journal of Agricultural and Food Chemistry 18, No. 3, 377-380 (May-June 1970)

BHA (2- and 3-tert-butyl-4-hydroxyanisole) is used in many food products and waxed package liners as an antioxidant. It may be used alone or in combination with BHT (3,5-di-tert-butyl-4-hydroxytoluene) and PG (n-propyl gallate) depending upon the food product and the conditions. This paper describes a new approach--a fluorimetric method--for the quantitative determination of BHA in lard, ready-to-eat cereals, and waxed package liners.

Lard was dissolved in an ethanol-ligrone mixture and the solution analyzed directly by a standard addition method that corrects for the interference due to BHT or PG. BHA in cereals and packaging materials must first be separated by a combination of extraction and thin-layer chromatography. Because the method makes use of the native fluorescence of BHA, the problems encountered with colorimetric methods are avoided. [3 tables, 11 references] FTP

7.593

the improved mass transport effects. For analytical work, 2 or 3 mm. internal, diameter columns are used; consequently, small samples are used with a sensitive, spherical nature of the exchangers. Carrier velocities greater than 3 cm./sec. continuous detector. High column pressures may be used because of the hard, may be used with good results. [6 figures, 20 references]

7.51 ESTIMATION OF LABILE SULFIDE CONTENT OF CELLULAR COMPONENTS

Miller, Richard W. (Cell Biology Research Institute, Research Branch, Canada Department of Agriculture, Ottawa, Ontario, Canada)
Analytical Biochemistry 35, No. 1, 181-192 (May 1970)

Neither the oxidized nor the reduced forms of the iron sulfide proteins can be quantitatively determined by spectroscopic means in intact respiratory membranes. The authors, therefore, adapted a widely used colorimetric procedure (Fogo and Popowski, 1949) based on the release of labile sulfide in order to estimate amounts of nonheme iron proteins in crude cell fractions. The method they devised is more specific for the iron-sulfur complex than methods based on release of nonheme iron alone because contamination of samples by ferric ions is not important. [3 figures, 1 table, 14 references] FTP

7.51

distill sample until 90 ml. of distillate is collected (about 10-15 min.); (6) titrate the ammonia in the distillate in the usual manner.

[3 tables, 14 references]

8.0 (1.951) PRELIMINARY STUDY OF THE PROXIMATE COMPOSITION OF MEAT OF FUR SEAL, CALLORHINUS URSINUS

Nelson, Richard W., and Harold J. Barnett (Bureau of Commercial Fisheries Technological Laboratory, 2725 Montlake Boulevard East, Seattle, Washington 98102)
Fishery Industrial Research 6, No. 2, 89-92 + 3 (May 1970)

Finding profitable uses for the carcasses of fur seal has presented a problem to the Bureau of Commercial Fisheries. As a part of an effort to encourage use of the carcasses, several separate lots of meat and ground eviscerated carcasses were analyzed to determine proximate chemical composition. In this preliminary study, individual carcasses and samples from lots of ground carcasses were high in protein content and variable in oil content. Analyses of small samples of male and female seals taken at different times during the harvesting season indicated that variation in composition did not correlate with the time of sampling nor with the sex of the animal. [4 tables, 3 photographs, 1 references] Authors' abstract

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7.520 AUTOMATIC ANALYSIS OF AMINO-ACID SEQUENCES IN PROTEINS AND PEPTIDES

Von Will, M. (Spinco-Abteilung der Fa. Beckman Instruments G.m.b.H. 8 München 45, Frankfurter Ring 115, Germany)
Angewandte Chemie (International edition in English) 9, No. 4, 267-273 (April 1970)

The author discusses the development of the widely used automatic method of analysis of protein and peptide analysis from Edman's manual sequence. In the method of automatic sequence analysis described, all reaction, centrifugation, extraction, and drying operations are carried out in a rotating vessel. At minimal costs in time and material, 60 amino acids have been split off consecutively from a single sample of myoglobin. [2 figures, 2 tables, 65 references] FTP

7.8 (9.14)(6.51) DETERMINATION OF TOTAL CAROTENOID PIGMENTS IN TROUT AND SALMON FLESH

Saito, A., and L. W. Regier
New Series Circular No. 36, 3 pp. (April 22, 1970) (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia)

In the evaluation of fish from culture or farming systems it is desirable to have a measure of the pigmentation of the fish flesh. A moderately pink tissue in the salmonids is quite desirable while an unpigmented grayish-white flesh does not have the same appeal.

The pigments of fish of the salmonid species consist mainly of carotenoids and are acquired through the diet from such foods as crustaceans, i.e. shrimp, crab etc. The dominant carotenoid in the muscle tissues is usually astaxanthin with several others in minor amounts. In fish receiving a diet containing plant material, a significant amount of a xanthophyll (lutein) may also be present.

The characteristic light absorption spectra of the carotenoids are used for identification and estimation of these compounds. Most of them have quite similar molar extinction coefficients at a wave length of 460 nanometers. Thus, the amount of light absorption at this wavelength of an organic extract of the flesh can be taken as a measure of the total carotenoid content. This relationship is the basis for the...procedure [described here]....

The concentration of carotenoid giving a desirable color to the fish flesh is 20% of dried shrimp waste (containing about 10 mg carotenoids/100 g dry wt.)

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Reprinted in part

8.53 LIPID COMPONENTS OF TYPE A SCHOOL LUNCHES

Murphy, Elizabeth W., Louise Page, and Percilla C. Koons (Agricultural Research Service, U.S. Department of Agriculture, Hyattsville, Maryland)
Journal of the American Dietetic Association 56, No. 6, 504-509 (June 1970)

A nationwide study was undertaken in 1966 to provide data on the nutritive content of the Type A lunches served to American school children. (A Type A lunch for a 10-to-12-year-old child must contain: 1/2 pint fluid whole milk served as a beverage; 2-ounce serving of meat or alternate; 2/3-cup serving of two of more vegetables or fruits, or both; one slice of whole grain or enriched bread; and 2 teaspoons of butter or fortified margarine. Other foods may be added to round out the meal.) The lunches examined were those served to sixth graders in 300 schools.

On the average, the lunches contained: 31.8 g. of fat; 14.6 g., saturated fatty acids; 10.2 g., mono-unsaturated fatty acids, of which 9.5 g. was oleic acid; and 3.8 g., polyunsaturated fatty acids, of which 2.9 g. was linoleic acid. The fat furnished 39 percent of the calories.

Five fatty acids--linoleic (18:2), oleic (18:1), palmitic (16), stearic (18), and myristic (14)--accounted for about 90 percent of the total fatty acids. Linoleic acid accounted for approximately 10 percent of the total fatty acids and about 4 percent of the calories.

The level of sterols averaged 112 mg. per lunch with a range of from 16 to 331. [4 tables, 13 references]

FTP

7.86 (0.5) PYRROLIDONYL PEPTIDASE IN BACTERIA: A NEW COL[O]RIMETRIC TEST FOR DIFFERENTIATION OF ENTEROBACTERIACEAE

Mulczyk, M., and A. Szewczuk (Department of General Microbiology and Department of Biochemistry, Institute of Immunology and Experimental Therapy, Polish Academy of Sciences, Wrocław, Poland)
Journal of General Microbiology 61, Part 1, 9-13 (April 1970)

The authors describe a simple colorimetric test for detection of the activity of pyrrolidonyl peptidase (PLP) in bacteria and discuss its adaptation to the differentiation of the various groups of Enterobacteriaceae. Of 2,354 strains of enteric bacteria tested, 451 were PLP-positive: 223 of 226 strains of Citrobacter, 178 of 188 strains of Klebsiella, 49 of 52 strains of Enterobacter, and 1 strain of Serratia. PLP was not detected in 1,146 Shigella, 354 Salmonella, 333 Escherichia, 21 Arizona, or 33 Proteus, Providencia, and Hafnia strains. PLP activity was detected in strains of Bacillus, Streptococcus, Staphylococcus, Micrococcus, Sarcina, Neisseria, and Pseudomonas.
[1 figure, 2 tables, 12 references]

LB

8.8 (0.5) THE EFFECTS OF FREEZING ON THE SURVIVAL OF SALMONELLA AND E. COLI IN PACIFIC OYSTERS

Digirolamo, R., J. Liston, and J. Matches (Institute for Food Science and Technology, College of Fisheries, University of Washington, Seattle 98105)
Journal of Food Science 35, No. 1, 13-16 (January-February 1970)

An inoculum containing Salmonella derby or S. typhimurium and Escherichia coli was injected into the intestinal region of samples of Pacific oysters (Crassostrea gigas), and the oysters were frozen by four methods. The freezing methods consisted of holding the oysters (1) in a plate freezer at -30° F., (2) in a chest freezer at -10° F., (3) on the shelf of a sharp freezer at -30° F., and (4) in a storage room at 0° F. The frozen oysters were stored at 0° F., and the number of inoculated bacteria that survived was determined at intervals during the storage period.

In another test, inoculated oysters were homogenized, and samples of the ground oysters were stored at 32° F. and at 30° F. for 7 days. Survival of the inoculated organisms in the homogenate was determined during periodic intervals of storage. In addition, bacterial counts and pH of the homogenate were determined.

The two species of Salmonella inoculated into oysters were highly sensitive to freezing regardless of the method used to freeze the oysters. About 1 percent of the Salmonella survived after 48 hours. The number of Salmonella decreased steadily during frozen storage.

(over)

FTP

7.80 A REEXAMINATION OF THE TWO-STAGE TRIANGLE TEST FOR THE PERCEPTION OF SENSORY DIFFERENCES

Gridgeman, N. T. (Division of Biology, National Research Council, Ottawa, Canada)
Journal of Food Science 35, No. 1, 87-91 (January-February 1970)

In this review of the theory and practice of the two-stage triangle test for the sensory perception of small differences, the author concludes that the disadvantages of the test outweigh the advantages. In the comparative assessment of the sensory characteristic (flavor, odor...) of a pair of products by two-stage triangle tests, each trial involves three coded items, two of one product and one of another, in which the panelist is asked (1) if one of the triad appears to be sensorily different and, if so, (2) to characterize the difference. The author claims that when the test is used, its information content is difficult to assess. He proposes a "least objectionable" method based on a scoring scheme and statistical significance procedures. [7 tables, 8 references] FTP

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in the diet. If the values are lower, then additional quantities of shrimp waste or similar material should be incorporated in the diet. A period of 12 weeks on a diet adequate in carotenoids is required to obtain the desired pigmentation. Higher levels are to be discouraged since it gives the fish flesh an artificial appearance. More detailed information on the inclusion of carotenoid rich materials in the diets of farmed fish will be issued as soon as the present studies are completed.

7.8

7.874 (1.85) TRIMETHYLAMINE OXIDE CONTENT OF NORWEGIAN SHRIMPS AND ITS DEGRADATION TO METHYLAMINES AND FORMALDEHYDE. II. DETERMINATION OF TRIMETHYLAMINE OXIDE, TRIMETHYLAMINE, DIMETHYLAMINE, AND FORMALDEHYDE, AND THE EFFECT OF CATALYSTS ON THE DECOMPOSITION OF OXIDE

Sundsvold, O. C., B. Uppstad, G. W. Ferguson, T. McLachlan, and D. Feeley (Office Norw. Qual. Contr. Inst. Canned Fish Prods., Stavanger, Norway)
Chemical Abstracts 72, No. 15, 77589t (April 13, 1970)

Because previous workers using gas-liquid chromatography have not determined either the potassium salt of O-demethyl malathion or malaoxon, the present authors developed a thin-layer chromatographic method for detecting malathion and its metabolic and hydrolytic products. The method proposes the use of one of three solvent systems: benzene:hexane:acetic acid (40:40:20), benzene:acetic acid (80:20), or hexane:acetic acid:ethyl ether (75:15:10). Those metabolites that had close Rf values were resolved by two-dimensional thin-layer chromatography using two solvent systems: benzene:hexane:acetic acid (40:40:20) and hexane: acetic acid:ethyl ether (75:15:10). (R_f is the symbol for the ratio of the rate of movement of a given spot to that of the solvent boundary.) The author states that the method is suitable for separation and determination of malathion and metabolites in stored grain. [1 figure, 1 table, 9 references] FTP

7.9 (9.19) THIN-LAYER CHROMATOGRAPHIC SEPARATION AND COLORIMETRIC DETECTION OF MALATHION AND SOME OF ITS METABOLITES FROM STORED GRAINS

Kadoum, Ahmed M. (Department of Entomology, Kansas State University, Manhattan, Kansas 66502)
Journal of Agricultural and Food Chemistry 18, No. 3, 542-543 (May-June 1970)

8.59 (1.80)(2.03) OCTOPINE AND LACTATE DEHYDROGENASES IN MOLLUSC MUSCLES

Regnouf, Françoise, and Nguyen van Thoai (Laboratoire de Biologie Marine du Collège de France, Concarneau, France)
Comparative Biochemistry and Physiology 32, No. 3, 411-416 (February 1, 1970)

Octopine, specifically catalyzed by NADH-dependent octopine dehydrogenase (ODH), is produced mainly in striated muscles; it occurs very little or not at all in smooth muscles. The formation of octopine blocks the pyruvate formed during muscle glycolysis and prevents it from being reduced into lactate. The tissues of some species that exhibit ODH activity show no evidence of the presence of lactate dehydrogenase (LDH); moreover, the presence of LDH excludes the presence of ODH. The mutual exclusiveness of the two enzymes suggests a close relation between the two. The authors surveyed the distribution of octopine, ODH, and LDH in the muscles of 16 gastropods, 1 scaphopod, 24 pelecypods, and 6 crustaceans.

Of 42 molluscs studied (the 41 listed plus one by Kojima and Kusakabe in 1955), 24 contained ODH and 24 contained LDH; 13 contained both, in which case ODH activity was higher. All the crustaceans exhibited LDH activity; ODH was not detectable. Although lactic acid was not determined in all assays, NADH consumption, in the presence of pyruvate and the absence of arginine, was sufficiently significant to be ascribed to LDH activity. The amount of determined lactate in both mollusk and crustacean extracts was lower than that calculated from oxidized NADH, the difference possibly being attributable to other oxidoreductase activity.

[1 table, 15 references] LB

8.8 (4.80)(0.5) SURVIVAL OF PATHOGENIC BACTERIA IN SOME PHARMACEUTICAL OILS

Myers, G. E.
Canadian Journal of Pharmaceutical Sciences 4, No. 4, 75-78 (1969)

The paper describes experiments carried out over a period of 4 years to determine the duration of viability of four strains of pathogenic bacteria (three strains of Staphylococcus aureus and one strain of Pseudomonas aeruginosa) and two strains of nonpathogenic bacteria (Bacillus subtilis and Clostridium sporogenes) in three pharmaceutical oils (Oleum arachis [peanut oil], Oleum morrhuae [cod-liver oil], and light liquid petrolatum).

All six strains of the microorganisms remained viable for over 2 years in cod-liver oil. None of the test bacteria remained viable for 3 years in the cod-liver oil. [3 tables, 39 references] FTP

8.8

The E. coli in the inoculated oysters showed 10 to 30 percent survival after 1 week of frozen storage of the samples. The survival rate of the E. coli was variable and erratic during the first 7 days of storage of the inoculated oysters. The survival rates of the Salmonella and the E. coli suspended in the homogenates of the oyster meats stored at 32° F. and 30° F. were higher than the survival rates in the frozen whole oysters stored at 0° F.

The authors conclude that it is not advisable to use the count of fecal coliforms as an indicator of the sanitary quality of frozen oysters.

[4 figures, 5 tables, 17 references]

9.11 (0.112) SPECIAL REPORT: OCEANOGRAPHY

Optical Spectra 4, No. 5, 32-70 (May 1970)

The seven articles and the editorial introduction constituting this special report discuss various aspects of the underwater visibility problem.

"Optics and Oceanography," Anonymous. pp. 32-33.
In search or exploratory type of missions underwater, a need exists for the capability of obtaining useful imagery over distances as great as 10 meters or more in murky water. Such a goal may possibly be reached through the use of holographic techniques and acoustic imaging, [1 illustration]

"Assessing Underwater Visibility," by Roswell W. Austin, pp. 34-39.
This article considers some of the problems involved in applying optical techniques to the ocean environment and some of the instruments used. [9 figures]

"But Will It Work at Sea?" by Jan Hahn, pp. 40-41.
Instruments must be specially designed and constructed to meet the peculiar and rugged requirements involved in seagoing research. [2 illustrations]

"Optics and the Physical Parameters of the Sea," by L. Richard Lankes, pp. 42-49.
This article discusses the principles involved in the transmission of light through water. [15 figures]

(over)

9.13 (9.16)(1.37) (9.19) EFFECTS OF LOW ENVIRONMENTAL pH ON BLOOD pH AND SODIUM BALANCE OF BROOK TROUT

Packer, Randall K., and William A. Dunson (Department of Biology, Pennslyvania State University, University Park, Pa. 16802)
Journal of Experimental Zoology 174, No. 1, 65-72 (May 1970)

Several investigators have shown that the ability of fish to extract oxygen from water decreases as the pH of the water decreases. The present investigators were interested in finding out if brook trout (Salvelinus fontinales) exposed to low pH experienced a lowering in blood pH, which could account for the fish's inability to extract O_2 from the water. They hoped that an understanding of the basic mechanisms by which low pH affects the metabolic processes of fish would make it easier to decide what could be done to restore polluted streams to a condition tolerable by fish.

The mean blood pH of trout exposed to water pH's ranging from 3.0 to 3.3 dropped from 7.39 to 6.97. At an environmental pH of 3.5, the fish lost 50 percent of their total body sodium. At pH's between 3.0 and 4.9, control sodium influx (72.5 µmoles/100 g. hours) decreased to 0 as sodium efflux increased appreciably over control levels. The difference in body sodium content of trout from three streams ranging in pH from 6.05 to 7.10 was insignificant. The fish survived for between 13.1 and 14.7 hours in a 150 mM sodium solution of pH 3.5; at 100 µM sodium and pH 3.5, they lived for only 2.5 to 4.9 hours.

(over)

9.14 PROTEIN NUTRITION IN FISH.
I. THE UTILIZATION OF DIETARY PROTEIN BY YOUNG CARP

Ogino, Chinkichi, and Kunio Saito (Tokyo University of Fisheries, Konan 4, Minato-ku, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 3, 250-254 (March 1970) (In Japanese; figures, tables, and summary in English)

To determine the utilization of dietary protein by young carp, the authors fed them for 30 days one of eight diets ranging in crude protein from 0.4 to 55.0 percent. All the diets contained the same percentages of α-starch (15); soybean oil (5); mineral mixture (2); and cellulose powder, vitamin mixture, and yeast (1 each). As the dextrin was decreased from 75 to 10 percent, the casein was increased in compensation from 0 to 65 percent.

The results showed that body weight increased in proportion to the content of protein; the accumulation of protein in the body reached a definitive value when the crude protein level reached about 38 percent. The protein accumulation rate (protein accumulated/protein consumed) was highest at about 21 percent of the protein level; protein utilization value (protein accumulation rate × protein content) was highest at 38 percent of protein level. The relation between the protein-efficiency ratio, and net protein utilization was also determined.

From the results, the authors conclude that when casein is the sole source of protein, young carp require about 38 percent of protein in the diet. [5 figures, 3 tables, 9 references]

9.16 FISH FARM ENCLOSURES. 4. DESIGN PROBLEMS AND CALCULATIONS

Milne, P. H.
World Fishing 19, No. 3, 46-48 (March 1970)

The material for this article was prepared for the Department of Civil Engineering, University of Strathclyde, England. This part briefly outlines the design of enclosure nets for fish farms, taking into account wind, wave, and current forces. The fish-farm enclosures discussed are of three types: (1) isolated enclosures surrounded by a net structure in the middle of a bay with no foreshore, (2) shore enclosures with a portion of the foreshore extending into deep water and surrounded by a net structure, and (3) sea-loch enclosures with a net structure at the entrance only. [2 references]

5. METHODS OF RETENTION. Ibid. No. 4, 24-26 (April 1970).
The author reviews the information available on the various materials and methods used in the construction of barrages, breakwaters, and seawalls for marine fish farms. [2 illustrations, 51 references]

9.19 DEGRADATION OF ENDRIN, ALDRIN, AND DDT BY SOIL MICROORGANISMS
(0.5)

Patil, K. C., F. Matsumura, and G. M. Boush (Department of Entomology, University of Wisconsin, Madison 53706)
Applied Microbiology 19, No. 5, 879-881 (May 1970)

Chlorinated hydrocarbon insecticides have been used extensively throughout the world and, as a result, they and their metabolites have accumulated in the soil. Earlier studies have shown that these insecticides are decomposed by microorganisms. The purpose of the present study was to test 20 soil organisms for their ability to degrade endrin, aldrin, DDT [1,1-bis(p-chlorophenyl)-1-chloro-2, 2,2-trichloroethane], Baygon (O-isopropoxyphenyl-N-methyl carbamate], and γ-BHC (gamma isomers of benzenehexachloride). The microorganisms tested were: Trichoderma viride 12 and 41; Pseudomonas spp. 27, 33, 34, 94, 103, 105, 117, 138, and 265; Micrococcus 204; Arthrobacter sp. 278; Bacillus spp. 458, 459, and 461; and unidentified species 96, 108, 158, and 202. Matsumura and Boush described the isolation of these organisms (Science 156, 959-961 [1967]).

All the isolates were able to degrade DDT and endrin and 13 of them were able to degrade aldrin. None of the organisms was able to degrade Baygon or γ-BHC.
[1 figure, 1 table, 15 references] FTP

9.13

The authors suggest that the inability of trout to live in waters whose pH is less than about 5 is apparently related to the drop in blood pH, which is caused by the high hydrogen ion concentration of the water--the loss of body sodium is of secondary importance as a cause of death.
[2 figures, 3 tables, 15 references]

9.14 NUTRITION OF PROTEIN IN YOUNG CARP.
I. NUTRITIVE VALUE OF FREE AMINO ACIDS

Aoe, Hiroshi, Isao Masuda, Isao Abe, Takashi Saito, and Toshiko Toyoda (Central Laboratory of Nisshin Flour Milling Co., 177, Tsurugaoka, Ohi, Irumagun, Saitama, Japan) and Sasaburo Kitamura (Oriental Yeast Co., 3-6-10 Azusawa, Itabashi-ku, Tokyo)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 4, 407-413 (April 1970)

Various kinds of animals, including human beings, can maintain their normal growth when fed a mixture of free amino acids rather than the protein itself. Several workers have determined the amino acids that are indispensable for salmonoid fishes. Dupree and Halver (in press) have succeeded in establishing an amino-acid test diet that will sustain normal growth in channel catfish (Ictalurus punctatus); they use a low Mg^{++} and SO_4^{--} salt mixture in place of the mineral salt mixture USP XIV previously used. In light of these results, the authors tried to keep young carp on diets in which casein and gelatin were partly or wholly replaced by amino acids.

The hydrolyzates of casein, after being treated with trypsin, could not replace the casein itself. Although increasing the level of cellulose flour or agar-agar (used as a binder in the test diets) controlled the retention time of the amino-acid diet in the intestine, causing it to be retained as long as the casein-gelatin diet was, the growth of young carp was improved not at all. Even a diet similar to that used by Dupree and Halver would not maintain the growth of the young carp. Nor would a diet formulated along the lines used successfully on rainbow trout, Salmo gairdneri irideus, by Shanks et al. (1962). Although the young carp devoured these diets well, they exhibited a marked retardation of growth that corresponded with the amount of free amino acids used in place of protein. These results suggest that the protein nutrition of carp is different from that of channel catfish and rainbow trout. [1 figure, 4 tables, 10 references] LB

9.11

"The Computer in Hydrological Optics," by Otis E. Brown, pp. 50-54.
The author discusses the use of the computer as a tool for solving a wide range of complex optical problems applicable to oceanography.
[6 figures, 26 references]

"Oceanographic Platforms," by L. R. Lankes, pp. 56-61.
This article is a review of the instrumentation platforms (anchored buoys, unmanned ships, towers, research ships) used in oceanographic research.
[2 figures, 1 illustration]

"Viewing Systems for Submersibles," by L. Richard Lankes, pp. 62-67.
Discussed here are the problems involved in the design of underwater optical systems for submersible research craft. [8 figures]

"Underwater Photography," by Bates Littlehales, pp. 68-70.
This article is a brief review of the equipment and techniques used for underwater photography. [1 illustration]

9.19 MICROBIOLOGY OF THERMALLY POLLUTED ENVIRONMENTS
(0.5)

Brock, Thomas D. (Department of Microbiology, Indiana University, Bloomington, Indiana)
Technical Progress Report, May 1, 1969-April 30, 1970, United States Atomic Energy Commission Contract AT (11-1)-1804, 18 pp. (November 10, 1969) Available from the Clearinghouse for Scientific and Technical Information, U.S. Department of Commerce, Springfield, Virginia 22151. Price $3.00.
Nuclear Science Abstracts 24, No. 6, 1128, Abstract No. 11359 (March 31, 1970)

9.16 TOW-BAR SYSTEM FOR SEINING FARM PONDS

Coon, Kenneth L. (Commercial Catfish Culturist, P.O. Box 476, Tuckerman, Arkansas 72473), and James E. Ellis (Bureau of Commercial Fisheries Exploratory Fishing and Gear Research Base, 5 Research Drive, Ann Arbor, Michigan 48103)
Fishery Industrial Research 6, No. 2, 83-88 (May 1970)

A simple, relatively inexpensive, tractor or truck tow-bar system was developed and tested to remove farm-cultured fish from ponds up to 450 feet wide and of any length.

The advantages of the system over manual methods include: (1) when the system is used, draining the pond is unnecessary, (2) seining is more convenient and faster, and (3) increasing the efficiency in this manner reduces the cost per acre of water seined and per pound of fish handled.

The main limiting factor is the adequacy of the levees or shore of the pond to accommodate the tractors or trucks.
[5 figures, 2 references] Authors' summary

9.19 EFFECTS OF OIL-SPILL REMOVERS (DETERGENTS) ON THE GASTROPOD NUCELLA LAPILLUS ON A ROCKY SHORE AND IN THE LABORATORY

Bryan, Geoffrey W. (Plymouth Lab., Plymouth, England)
Chemical Abstracts 72, No. 13, 64090y (March 30, 1970)

9.19 (0.5) ULTRAVIOLET DEVITALIZATION OF EIGHT SELECTED ENTERIC VIRUSES IN ESTUARINE WATER

Hill, William F., Jr., Frederick E. Hamblet, William H. Benton, and Elmer W. Akin (Gulf Coast Water Hygiene Laboratory, Environmental Health Service, U.S. Public Health Service, Dauphin Island, Alabama 36528)
Applied Microbiology 19, No. 5, 805-812 (May 1970)

Previous work has demonstrated that viruses continuously contaminate, via domestic pollution, this nation's waterways, including the saline waters of estuaries. Commercial artificial purification of shellfish will probably require large quantities of raw estuarine water. To insure public health safety, the raw sea water used for depurating shellfish must be treated to destroy pathogenic organisms. Ultraviolet (UV) radiation destroys coliform organisms and has been proposed as the treatment method in shellfish depuration systems. In earlier work (Hill, Hamblet, and Benton, 1969) at the authors' laboratory, effective virological disinfection was achieved with poliovirus type 1 (vaccine strain) in continuously flowing sea water by the Kelly-Purdy UV Seawater Treatment Unit. Because of the potential hazards involved, the experiments were not performed with other members of the enteric virus group. The purpose of the present study was to comapre the devitalization characteristics of six enteroviruses and one reovirus with that of poliovirus type 1 (reference virus) suspended in estuarine water and exposed to UV radiation under identical conditions.

(over)

9.2 FOREIGN ASSISTANCE: OBJECTIVES AND CONSEQUENCES

Griffin, K. B., and J. L. Enos (Magdalen College, Oxford, England)
Economic Development and Cultural Change 18, No. 3, 313-327 (April 1970)

In this article, the authors discuss the reasons countries lend assistance to other countries and the consequences of such aid. They conclude that the pattern of development in a country is complex and the effect upon this pattern of foreign assistance has yet to be determined. They suggest, too, that the relationship usually assumed to exist between aid and national growth is too simple. Foreign aid, generally, has not accelerated growth nor helped to foster democratic regimes. Aid may possibly have retarded development by leading to lower domestic savings, by distorting the composition of investment, by frustrating the emergence of an indigenous entrepreneurial class, and by inhibiting institutional reforms. Limited available evidence suggests that aid programs, as currently administered, and insofar as they are concerned with economic development, frequently are counterproductive. [35 footnotes]

9.19 PERSISTENT PESTICIDES AND ENVIRONMENTAL QUALITY

Anonymous (Articles in the journal are written and edited by students of the Columbia Law School)
Columbia Journal of Law and Social Problems 6, No. 1, 122-143 (January 1970)

This article reports on the argument over the use of persistent pesticides. (A persistent pesticide, for the purposes of the article, is any of a number of synthetically produced compounds which, when released into the environment, retain their biological activity for a period of years.) The continued contamination of the environment by these pesticides serves to illustrate the general lack of appreciation for the importance of a quality environment.

The article concludes that if the nation is to succeed in its desire for a quality environment, it must change the perspective of its laws. Where governmental agencies are directed to weigh the considerations in administering the law, the directions should be explicit as to environmental quality. Furthermore, the Federal government should adopt legislative measures and coordinated agency actions that are consistent with a strong national policy of environmental quality. Finally the article concludes that if each problem of environmental pollution requires the amount of damaging evidence that was required before action was taken against persistent pesticides, then environmental quality is doomed to be an illusionary concept. [140 footnotes]

9.2 UNEXPLOITED SOURCES OF NEW PRODUCT OPPORTUNITIES

Hilton, Peter (Institute for Corporate Diversification, Ltd., 135 E. 44th Street, New York, N.Y. 10017)
Food Technology 24, No. 5, 49-51 (May 1970)

The author estimates the new product development situation as follows: (a) about 1½ to 7 years will be required to reach profit levels for a new product introduced into the market; (b) the cost of bringing a new product to the marketing stage will be substantially higher in 1970 than in 1965; (c) marketing, not technology, is the bottleneck in the successful commercialization of new products; (d) new product failures are increasing; (e) the number of significant new products is fewer now than at any time since World War II; and (f) the market-life of new products is growing shorter.

Methods for improving the effectiveness of research and development programs in the food industry suggested by the author are: (a) upgrade the end product by use of all available resources, both internal and external; (b) increase the amount of cross licensing to spread the benefits of improved technology; (c) be more selective of the products to be marketed; (d) create the position of corporate product searcher to locate products and technology from other sources; and (e) institute an audit of patentable technology that exists within the organization with a view to marketing the technology externally.

9.19 CW [CHEMICAL WEEK] REPORT. ENVIRONMENTAL CONTROL

Schwartz, Irvin
Chemical Week 106, No. 24, 79-102 (June 17, 1970)

This paper details how the process industries are trying to meet the challenge of controlling pollution. The chemical and equipment industry is involved to the amount of $1 billion per year in protecting the environment, in terms of money spent on in-plant control and in sales of chemical products and control tools to others. However, the situation is in constant change as new regulations, technology, and community pressures come to bear.

This report examined the three major areas of environmental improvement--air, water, and the handling of solid wastes. The author discusses the regulatory situation, the equipment and techniques available to solve pollution problems, and the markets for control products and services. Listed are (1) the Federal laws that regulate pollution control and (2) the name and address of the pollution control agency in each state. FTP

9.2 DEVELOPING NEW FOOD PRODUCTS FOR FOREIGN MARKETS

Morse, Roy E. (Rutgers, State University of New Jersey, New Brunswick, N.J. 08903)
Food Technology 24, No. 5, 52, 56 (May 1970)

Market research data on new products for the U.S. market are usually sophisticated and well developed, but are difficult to interpret. In fact, the rate of failure of new products in the U.S. market runs about 80 percent. Evaluation of limited market research data on U.S. developed products proposed for use in foreign countries is even more difficult. The author discusses briefly several case histories of U.S. products introduced into foreign countries. FTP

9.19 (6.31) EXPERIMENTAL ABSORPTION OF DIELDRIN BY CHLORELLA

Wheeler, William B. (Pesticide Research Laboratory, Department of Food Science, University of Florida, Gainesville, Fla. 32601)
Journal of Agricultural and Food Chemistry 18, No. 3, 416-419 (May-June 1970)

This study concerns the interactions between insecticides and algae. The authors demonstrate the absorption of dieldrin by Chlorella pyrenoidosa. Dieldrin penetrated the algal cells rapidly, and a maximum level per cell was reached within 6 to 24 hours after the cells were exposed to the insecticide.
[1 figure, 2 tables, 8 references] FTP

9.2 TRADING RULES ADOPTED FOR ANIMAL PROTEINS

Anonymous
Feedstuffs 42, No. 16, 44 (April 18, 1970)

New trading rules, effective March 1, 1970, were adopted by the rendering, meat packing, and feed manufacturing industries; they cover domestic buying-and-selling contracts in animal and poultry rations. The new rules contain terms and definitions covering meat meal, meat and bone meal, feather meal, poultry byproduct meal, and others. Also, the accepted tolerances, deficiencies, and penalties for each product are specified. The trading rules may be obtained from the National Renderers Assn., 3150 Des Plaines Ave., Des Plaines, Illinois 60018. FTP

9.19

The tests were carried out in a special UV exposure chamber simulating the geometry of the Kelly-Purdy UV Seawater Treatment Unit. The value of the surviving fractions of each virus was plotted against the UV exposure time. The standard regression analysis procedure was used for analytical treatment of the data.

Poliovirus types 2 and 3, echovirus types 1 and 11, and coxsackievirus A-9 exhibited similar devitalization characteristics (no statistically significant difference was found between their slope function and that of poliovirus type 1, $P > 0.05$). Conversely, the devitalization characteristics of coxsackievirus B-1 and reovirus type 1 were dissimilar from those of poliovirus type 1 (a statistically significant difference was found between the slope functions, $P < 0.05$). This difference (in devitalization of coxsackievirus B-1 and reovirus type 1) was attributed to the frequency distribution of single and aggregate virions, the geometric configuration, the size of the aggregates, and the severity of the aggregation. The devitalization curve of coxsackievirus B-1 was characteristic of a retardant die-away curve; that of reovirus type 1 was characteristic of a multihit-type curve. The calculated devitalization half-life values were: poliovirus types 1, 2, and 3--2.8, 3.1, and 2.7 sec.; echovirus types 1 and 11--2.8 and 3.2 sec.; coxsackievirus types A-9 and B-1--3.1 and 4.0 sec.; and reovirus type 1--4.0 sec.

The authors indicate that the experimental data presented can be extrapolated to the practical situation. They concluded that UV radiation can be effective and can be reliably used for treating estuarine water.
[4 figures, 3 tables, 28 references]

9.2 (9.3) A GAME-THEORETIC APPROACH TO THE NEGOTIATION PROBLEM

Johnston, John M., and Paul A. Bornstein (Naval Post Graduate School, Monterey, California) 53 pp. (1964) Masters Thesis
U.S. Government Research and Development Reports 70, No. 8, 16 (April 25, 1970). Available from the Clearinghouse for Federal Scientific and Technical Information, U.S. Department of Commerce, Springfield, Virginia 22151. Order No. AD-481 436. Price $3.00.

The negotiation process is formulated as a game to demonstrate the value of game theory in providing insight into certain aspects of negotiation. The aspects treated include selection of the initial position, cooperation, threats, and coalitions. FTP

9.2 (9.19) TRENDS IN THE OFFSHORE OIL INDUSTRY IN RELATION TO THE MARINE ENVIRONMENT

Bell, A. O., A. F. Brereton, G. B. Marriott, J. C. Straa, and R. O. Wilson (British Petroleum Co., Ltd.)
Quarterly Transactions of the Royal Institution of Naval Architects 112, No. 2, 181-190 (April 1970)

This paper attempts to assess the effects of the offshore environment upon the vessels and specialized marine structures used by the offshore oil industry, and upon the trends of probable developments within the next 10 years.
[11 figures, 14 references] pp. 191-197, 2 references] FTP
[A discussion section is included.

9.19 VOLUNTARY PRIVATE BEHAVIOR AS A MEANS TO REDUCE CONSUMER HEALTH HAZARDS AND ENVIRONMENTAL POLLUTION

Bruch, Carl W.
Brookings Institution, Washington, D.C., 214 pp. (1969)
U.S. Government Research and Development Reports 70, No. 8, 127 (April 25, 1970)
Available from the Clearinghouse for Federal Scientific and Technical Information, U.S. Department of Commerce, Springfield, Virginia 22151. Order No. PB-189 389. Price $3.00.

The document is concerned with how much reliance the public should place on voluntary private behavior to protect the environment and the consumer, and whether the voluntary activities of industry possess the potential to obtain necessary changes in environmental quality and to protect the consumer from health hazards. The study examined the nature of the regulatory process as a legal and administrative tool, the role of incentives and economics in pollution control, and a qualitative estimation of achievements of voluntary private behavior in the reduction of health hazards associated with foods, drugs, and cosmetics, and the indirect health hazards from air, water and solid waste pollution.

Author's abstract

9.6 A BRIEF GUIDE TO SOURCES OF SCIENTIFIC AND TECHNICAL INFORMATION

Herner, Saul
Information Resources Press, 2100 M Street, N.W., Washington, D.C. (1970) ix + 102 pp. Price: paperbound, $4.25; cloth-bound, $7.00.

This guide instructs in the most efficient means of seeking and identifying useful information sources, regardless of subjects involved or the reader's previous experience with information tools and techniques. The Guide contains the following sections: (1) Information Directions and Source Guidance, (2) Information on Ongoing Research and Development (R&D), (3) Current R&D Results, (4) Past R&D Results, (5) Major American Libraries and Resource Collections, (6) Organization of Personal Index Files, and (7) Relationship of the Scientist and the Engineer to His Information Tools and Mechanisms. The Appendix describes methods of obtaining certain types of Government documents.

FTP

9.3 OUTER BOUNDARIES OF THE CONTINENTAL SHELF

Chapman, W. McL. (Ralston Purina Co.)
Marine Technology Society Journal 4, No. 3, 7-18 (May-June 1970) (1730 M Street, N.W., Washington, D.C. 20036)

The author states that a precise definition of the outer boundary of the Continental Shelf and the construction of a new regime for the deep-sea bed are not necessary from the standpoint of the real world. Rather, they are very dangerous, not only to the peace and security of the world but to the general interests of the United States and the Free World. Moreover, the interests of the poorer nations--the very nations that changes in the Law of the Sea aim to assist--would suffer from such changes, as would the work of the United Nations in this field. At this point, the author gives seven specific reasons for his belief that changing the Law of the Sea would be disruptive of public order both on the sea and on the land. Any practical problem associated with harvesting the resources of the seabed (whether that of the Continental Shelf or of the ocean deeps) can be solved by changes in U.S. internal law and practice. The article ends with 10 recommendations (in addition to 10 proposals, made to a White House Conference by a fishery executive from Canada, relative to the fisheries aspect of the national commitment) for action by the U.S. Government in respect of United Nations Suboceanic Lands Policy.

LB

9.7 (0.7) FOOD ACCEPTANCE, A CHALLENGE TO NUTRITION EDUCATION -- A REVIEW

Lamb, Mina W. (Texas Technological Coll., Lubbock, Texas)
Journal of Nutrition Education 6, No. 2, 20-22 (1969)
U.S. Government Research and Development Reports 70, No. 11, 46 (June 10, 1970)

In order to be effective in the profession, the nutritionist and dietitian must understand why people eat as they do and why food is accepted or rejected. Primary in the parameters of food acceptance is the training of the young child in familiarity with a wide variety of food effective in maintenance of health. In dealing with adults, especially those in group-feeding situations, the dietitian and nutritionist must realize that food aversions are deep rooted and may require a team of experts a long time to help even one such person. The close association of food aversions with the total emotional and rational behavior of an individual has been established. As with all health problems, food aversions need to be recognized as one which was easier to prevent and control in the young than in the adult population. This is the challenge to nutrition education at all levels of learning, starting with the infant.

Author

9.6 FAO DOCUMENTATION. CURRENT INDEX
(CUMULATIVE, JANUARY-DECEMBER 1969)
VOL. 1. ANNOTATED BIBLIOGRAPHY
VOL. 2. AUTHOR AND SUBJECT INDEX

Anonymous
Documentation Centre, Food and Agriculture Organization of the United Nations, Rome, Italy (1970), Nos. 04926-08430.

These two volumes cover the material contained in the FAO monthly indexes (Nos. 1 through 11) for 1969 plus FAO publications issued in December 1969. Volume 1 has 3,505 entries.

The book has an index and an appendix. LB

9.6 THE TECHNOLOGY OF FOOD PRESERVATION

Desrosier, Norman W. (National Biscuit Co., Fair Lawn, New Jersey)
AVI Publishing Co., Box 670, Westport, Connecticut 06880 (Third Edition, 1970), 488 pp. $12 domestic, $13 foreign.

This Third Edition expands the material in the previous edition and adds four new chapters: Preservation of Semi-moist Foods, Principles and Preservation of Bakery Products, Storage Stability of Preserved Foods, and New Food Product Development. In these chapters, the author discusses the water activity of foods and the means of controlling and modifying it; the long-term storage of foods, recommendations and conditions for short- and long-term storage, and the economic factors governing relative costs of various storage systems; and the technology of developing new products for the food industry, including the decision-making processes involved.

LB

9.7 INFORMATION SCIENCE AS AN AID TO DECISION MAKING

Ernst, Ronald L., and Marshall C. Yovits
Technical Report, Computer and Information Science Research Center, Ohio State University, Columbus, Ohio, 26 pp. (1969)
U.S. Government Research and Development Reports 70, No. 8, 20 (April 25, 1970). Available from the Clearinghouse for Federal Scientific and Technical Information, U.S. Department of Commerce, Springfield, Virginia 22151. Order No. PB-189 666. Price $3.00.

The paper discusses the mutual interaction between information science and decision making. FTP

Last year (1969), an Industrial Research Institute Study Group considered two topics: (1) To identify the major problems that affect the relations between research and development (R&D) and other segments of the organization and (2) to suggest approaches which might be taken to solve or alleviate the major problem areas identified. Twelve major problem areas were identified and approaches to the solution of each were proposed. [27 references] FTP

9.7 TWELVE WAYS TO IMPROVE R&D--CORPORATE RELATIONS

Brown, Alfred E. (Celanese Research Co., Summit, New Jersey 07901), and Thomas S. Osdene (Philip Morris Research Center, Richmond, Virginia 23206)
Research Management 13, No. 3, 183-190 (May 1970)

9.19 BIOCHEMICAL FACTORS AFFECTING TOXICITY OF PARATHION AND SELECTED ANALOGUES TO FISHES

Leland, H. V., II (Univ. of Michigan, Ann Arbor)
Dissertation Abstracts International. Section B. The Sciences and Engineering 30, No. 2, 456 (1969)
Food Science and Technology Abstracts 2, No. 4, 575, 4R117 (April 1970)

The author found that the toxicity of parathion and its analogs to fishes was clearly related to the anticholinesterase potency of the respective oxygen analogs. Under some conditions, parts of the exposed fish may be unsafe for human consumption. LB

Many factors, including an adequate food supply and proper distribution, are needed to maintain a good life. An adequacy of food supply depends upon continued and successful efforts to reduce the rate of population growth. Furthermore, family income must be improved to eliminate poverty as a cause of hunger and malnutrition and rapid short-term solutions to problems must be found even while plans for long-term improvements are implemented. Governments must commit themselves to, and establish priorities for, goals that provide eradication of hunger and malnutrition for their populations. Only then can approaches and programs succeed with the help of the new food technologies that are available for use in man's behalf. FTP

9.4 PROPOSALS FOR ACTIVATING THE INTERFACE BETWEEN GOVERNMENTS & TECHNOLOGY

Altschul, Aaron M. (Foreign Agricultural Service, U.S. Department of Agriculture, Washington, D.C. 20250)
Food Technology 24, No. 3, 18-19, 22, 24, 26 (March 1970)

9.3 TERRITORIAL SEAS -- 3,000 YEAR OLD QUESTION

Florsheim, Bowen L.
Journal of Air Law and Commerce 36, No. 1, 73-104 (Winter 1970)

The international situation concerning the question of the breadth of the territorial sea is discussed under the following sections: I. Introduction, II. Background: General Development of the Law of the Sea, III. The Location of the Territorial Sea Belt, IV. Legal Rights in the Territorial Sea, V. The Breadth of the Territorial Sea: No Solution in Sight. [187 footnotes] FTP

This article reports on recent developments on flavoring ingredients generally recognized as safe (GRAS) for their intended uses as determined by an expert panel. It discusses (1) action by the panel on substances newly proposed for international use as flavor additives and (2) review by the panel of more recent technical information on certain flavoring ingredients previously judged to be GRAS. A table lists 124 additional substances generally recognized as safe for the uses that are described. [1 table, 16 references] FTP

9.3 RECENT PROGRESS IN THE CONSIDERATION OF FLAVORING INGREDIENTS UNDER THE FOOD ADDITIVES AMENDMENT. 4. GRAS SUBSTANCES

Hall, Richard L. (McCormick & Co., Baltimore, Maryland), and Bernard L. Oser (Food and Drug Research Laboratories, New York, N.Y.)
Food Technology 24, No. 5, 25-28, 30-32, 34 (May 1970)

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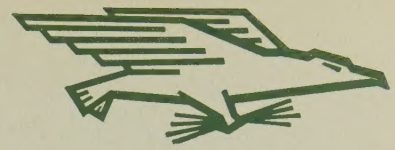

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